



FRIDAY, FEB. 10, 1893.

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Contributions.

Another Fraud.

London & North-Western Railway, }
852 BROADWAY, New York, Feb. 3, 1893. }

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am informed that a young Englishman giving his name as F. A. Webb has applied for transportation favors from railroad companies in the East, claiming to be a son of Mr. F. W. Webb, Chief Mechanical Engineer of this company at Crewe, England, who by the way is an unmarried man.

I again resort to this public way of warning all those to whom it may concern that the said F. A. Webb is not a son of Mr. F. W. Webb above mentioned; that he is not connected with this company in any official capacity, and he must be considered and treated as a fraud. The young man is described to me as follows: Age, about 22 years; height, about 5 ft. 9 in.; blond hair; regular features; light complexion; regular teeth; well dressed, and a good talker.

C. A. BARATTONI, G. P. & F. A.

Cut Rate Tickets on First-Class Lines.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Why will the various railroad companies sell a ticket of regular issue to one man for 75 per cent. of what they ask another? I always looked upon a scalper with a sort of holy horror, a beast of prey and to be feared; until some two years ago, when, being one day in St. Louis, and desiring to go to Chicago and thence to Omaha a friend asked me why I did not try a scalper. I expressed my horror of the animal, and he laughed. He went with me to a broker's office and we asked the price of a ticket. Asked if I was in a hurry, I said no. He said \$6. I gave him a ten dollar bill. He sent a clerk out with it and the clerk came back and gave him a ticket and five dollars. He put the five dollar bill in his money drawer, took out four dollars and gave me my ticket and that amount, he making one dollar on the deal.

I rode on the Vandalia to Indianapolis, the Panhandle to Chicago and the C. & M. & St. P. to Omaha. The fare was, as I recollect, at that time \$6 from St. Louis to Indianapolis, \$3 from Indianapolis to Chicago, and \$10 from Chicago to Omaha. The direct fare from St. Louis to Omaha was about \$12, and from St. Louis to Chicago was \$7.50. If this was not in violation of the discrimination clause in the Interstate Commerce law I am very stupid.

To-day the agents of most of the Chicago-New York lines sell an applicant at their counters a first-class ticket for \$20. If he goes into a broker's office and gives him the money that broker can buy the same ticket for \$15. At New York it costs the broker a dollar more. Now, most of these lines pay high rents for elegant offices. Are these offices too fine to be trodden by customers? Else why offer a commission for avoiding them?

I have no grudge against a broker, and it must be confessed that he not infrequently inserts a stillito beneath the ribs of the railroad that nurtures him. I recently traveled from Chicago to New York, and on the same train were two men riding on tickets secured from a broker who purchased them on a clergyman's half-fare permit.

But, back to the first question, Why do the railroads thus openly discriminate?

CHICAGO.

New Saloon Carriages on the London & South-Western Railway.

TO THE EDITOR OF THE RAILROAD GAZETTE:

On the 4th of March next, the "City of Paris" (now the "Paris") will sail from Southampton for New York, and her departure will inaugurate a new Transatlantic service. Specially designed and constructed rolling stock is now being turned out at the Eastleigh carriage works of the London & South-Western Railway for the express purpose of conveying passengers and mails between Southampton and London in connection with the new Inman and International route.

At some convenient and early date your readers may be interested in a fully illustrated description of the Eastleigh works, where the whole of the company's carriage and wagon stock is made and repaired in an admirably arranged and well built series of shops—space of some 43 acres being devoted to the purpose, and about 1,200 workmen being employed in the various departments.

At present, however, attention may be confined to some of the latest productions of the works, viz., the cars destined to run from the quay at Southampton—alongside the Atlantic liner—to Waterloo station, the London terminus, in considerably less than two hours, the distance being 79 miles. On the question of time occupied, by the way, it may be worth while giving an instance that recently occurred on the departure from Southampton of the "Fürst Bismarck," the well known North German Lloyd boat. Two heavily loaded specials carrying at least 500 saloon passengers and baggage, with mails, etc., left London, one of them 30 minutes after the other, and both arrived in Southampton in time to tranship all the passengers and freight, so that within two hours of the last train leaving London, the liner was steaming out to New York.

Owing to the somewhat limited time available for constructing the new cars before the service opens, only a first lot of these are now in hand. These will form a complete train embodying, I believe, the best points both of English and American rolling stock. That is, the safety of Pullman car construction, with its many advantages as an open car, with an opportunity for those who wish it to enjoy the isolation on the "compartment" plan, so dear to the English heart. Side entrances or doorways throughout, however, allow a more easy and rapid passage in and out than do the end platforms of an American car.

The new carriages are not of the "corridor compartment" type, but consist practically of a large central saloon, out of which open a ladies' compartment at one end and a smoking compartment at the other (both provided with lavatories), while beyond the latter is a single compartment quite isolated from the saloon, and with its own side entrances, thus preserving the ordinary compartment as it now exists throughout the English railways. The ends of the cars have no doors, and consequently no one can walk from car to car while the train is running. Each car has a total length of 47 ft. 6 in. over all. The underframe is very strongly though lightly built (the whole weight, indeed, of the empty car being no greater than about 47,000 lbs.), and no trouble is to be anticipated on the point of strength being insufficient, since the live load can hardly reach an excessive amount at any time. Strains of running require much more consideration.

Seating accommodation is provided in each car for 25 persons. The roof is elliptical in section and gives a clear height of 7 ft. 4 in. at the centre. This is sloped down to 6 ft. 5 in. at the sides. The car is only 8 ft. 4 in. in width over outside panels. Gas lighting on the Pintsch system is employed throughout; but the question of artificial heating not being as yet finally decided upon in a general sense by the directors, no efforts will be made at first to introduce new methods of warming the cars, the old foot warmers being still relied upon.

The truck frames are all of Fox pressed steel and the tests made on ordinary specimens taken at random show considerable strength.

The automatic vacuum brake is employed, as on all the stock. The interior finish will be all that the most exacting passenger could wish for on the score of luxury and comfort. Many of the details, however, are not yet finally decided on, so that they cannot be entered upon now. Most careful attention will be given to these points in the expectation of securing a great part of the American passenger traffic. Whether the inducements of special "trains de luxe" and a short journey to London in cars that run from the steamer side will effect such a result is a question that lies somewhat apart from railways and railway topics.

The writer is indebted to Mr. W. Panter, the courteous and obliging Superintendent of the Eastleigh works and his assistants for much of the information contained herein.

Stored Energy in Car Wheels.

LONDON, Jan. 3, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Is there not something wrong with the statement in the *Railroad Gazette* of Dec. 23, 1892, that there is more energy stored in a ton of car wheel than in a ton of car body? When a car moves forward one mile, does not the C. G. of the car wheel move also just a mile? Looking at a wheel rolling on a rail, we find that the top of the wheel is moving at just twice the velocity of

the train under which it is attached; but then that point which is in contact with the rail is absolutely at rest. The wheels do not move along the track as a whole, as is there stated, as well as revolve round their own axes. Prof. A. B. W. Kennedy, in his "Mechanics of Machinery," multiplied the distance traveled by a train by π , and says that this product is the distance which the wheels run on brake block. The statement, of course, is as erroneous as it well can be, for the periphery of a wheel rubs on the brake block just exactly the length it rolls on the rail. So with the energy of rotation stored in the wheel, this is merely identical with its forward motion, coincident with, but not supplementary thereto. If a wheel rolling at 40 miles per hour were free to continue rolling it would run a distance x . Could the same wheel be lifted off the rail and spun round at the velocity corresponding with 40 miles per hour on bearings having the same resistance as that opposed by the rail, then its periphery would rotate through a distance x exactly as if the wheel had been left to roll freely on a level rail. No difference, therefore, ought to be made between a pound of car body and a pound of wheel in figuring on the stored energy for brake purposes. At least so it seems to me, and I shall be glad to have the contrary definitely explained if I am wrong. AMERICUS.

[It is true that when a car moves forward one mile the centre of gravity of a car wheel moves also just one mile, for the reason that the centre of gravity of the wheel is at its centre of figure. It is also true that the top of the wheel moves twice as fast as the centre and the point in contact with the rail is at rest; but as the stored energy varies as the square of the speed, the top of the wheel has four times as much stored energy as the centre per pound of weight. The average, then, for the three points, top, bottom and centre, is $1\frac{1}{3}$ times as much stored energy per pound of weight as the mass at the centre of the wheel, which is, of course, moving at the same velocity as the body of the train. Now, this is not a true average, but it indicates that the argument offered by "Americus," and based on the fact that a wheel moves twice as fast at the top as at the centre, has no bearing on the question in point. Our correspondent will find, if he will trace the path of any point on the surface of a car wheel, that the wheels move along the track and also have another movement, which may be expressed with at least approximate accuracy by saying that the wheels move along the track as a whole and also revolve around their own axes. Our correspondent has assumed for illustration two cases in which the peripheries of two wheels are moving at 40 miles an hour. In one case the centre of the wheel is moving at a speed of 40 miles an hour, and in the other the centre of the wheel is fixed. He holds that if the wheel with the moving centre is permitted to run along the track, meantime overcoming a resistance equivalent to the journal resistance of the fixed wheel, would it not travel the same distance before it stopped as would a point on the periphery of the wheel with the fixed centre before it stopped. Not so. Supposing one wheel to be revolving on a fixed centre over one rail, and another wheel be traveling along the other rail at a speed of 40 miles an hour. At the instant in which the two wheels are opposite each other on the different rails, permit the wheel with the fixed centre to be set free and to roll along on the rail. The problem is, omitting all friction, what will be the comparative speeds of the two wheels along the track? Evidently the wheel that is already in motion along the track will move the faster of the two, as it has not only the necessary rotary motion, but also the motion along the track, while the other wheel has only the necessary rotary motion, and the motion along the track must be obtained by reducing the speed of rotation enough to give the energy needed to accelerate the wheel to the speed that it will finally have along the track. "Americus" will find it interesting, but withal a simple problem, to calculate what the final speed of the wheel which had a fixed pivot will be when it is dropped upon a rail and has to start itself into motion along the track.—EDITOR RAILROAD GAZETTE.]

The Evolution of the Railroad Turntable.

BY C. A. GREENLEAF, M. E.

First Article.

The first turntable which came into general use, especially in the West, was first seen by the writer in 1857, and is that illustrated in fig. 1. It cost about \$400, and worked well, and turned easily when first erected, and all was new; but after a few months severe service, it became flexible, and the ends of the timbers forming the platform "broomed" up several inches where compressed by the weight of the locomotive. This caused the table to deflect with the road, and the outer wheels bore on the circular track, which made the table turn very hard.

To relieve the extra friction caused by this dragging on the circular track, and to get the table to turn easier, the adjustable centre pin would be screwed around so as

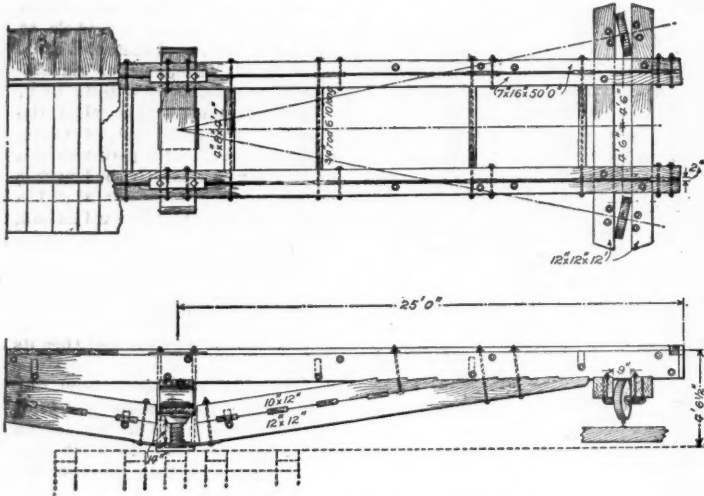


Fig. 1—Wooden 50-ft. Turntable, 1857.

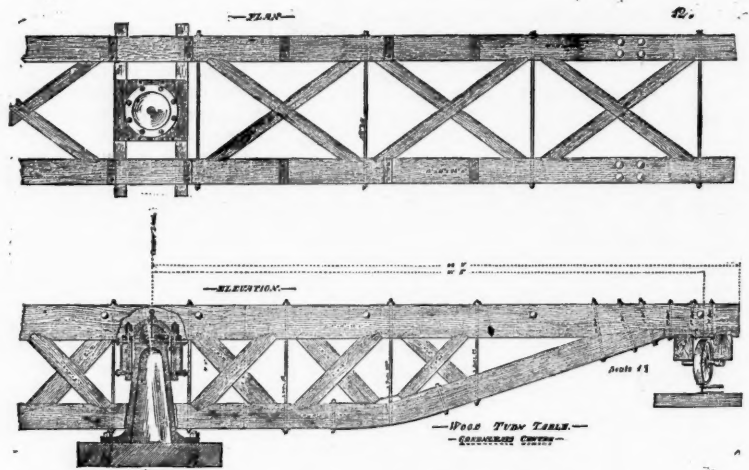


Fig. 2—Improved 50-ton Wooden Turntable, 1878.

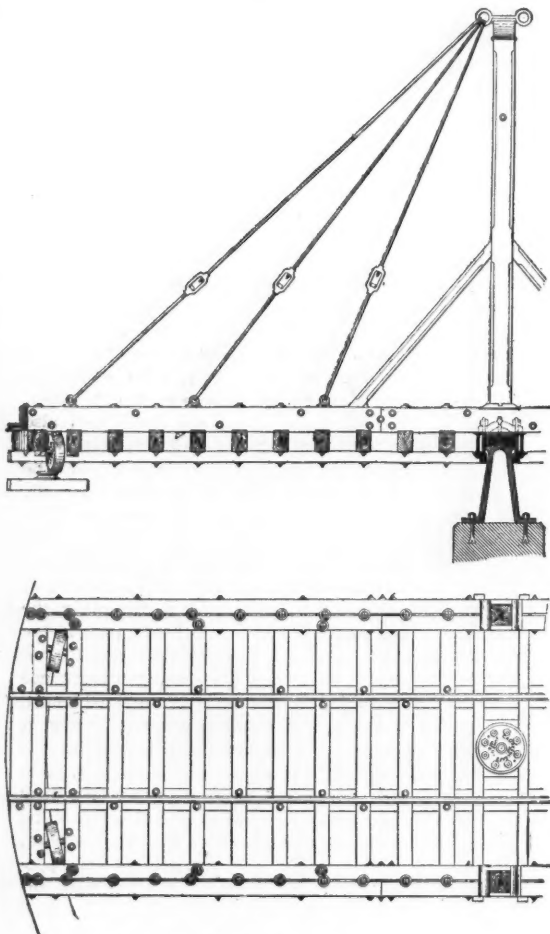


Fig. 3—Prairie Turntable, 48 ft. Diameter.

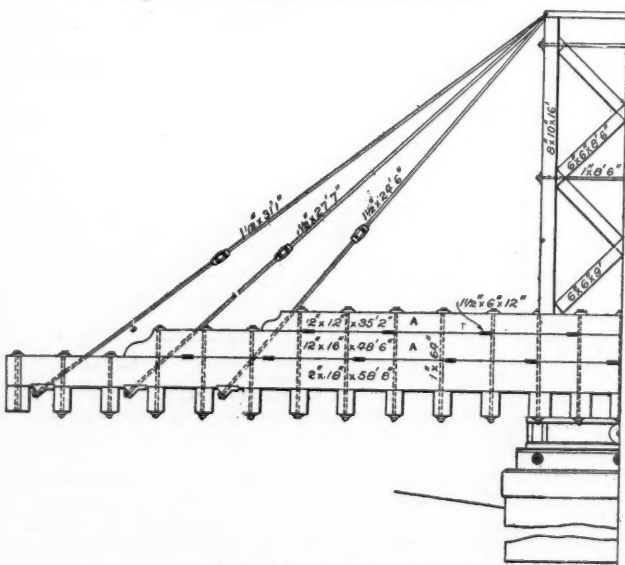
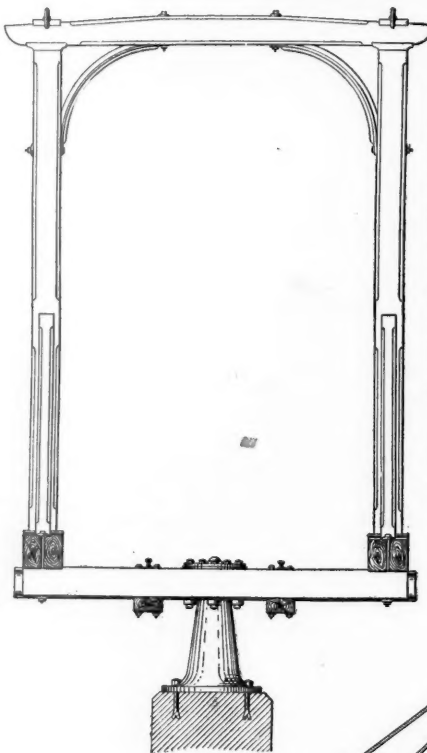


Fig. 4—Modified Prairie Turntable.



tion yet devised and turntable makers admit that they have not discovered a better design, either for economy or strength, than this "one beam" platform, with the girders immediately under the rails.

A combination wood and iron turntable that is a decided improvement over the former table is shown in fig. 2, the design being furnished me by the Chief Engineer of the Chicago & Northwestern in 1878. The principal improvement over the first table consists in the large iron plates at all the end joints and the manner in which they are securely bolted, top and bottom of the timbers, which arrangement completely prevents the "brooming" of the wood, at said joints, when brought in compression. The iron cross beams at the centre which bear the entire vertical load are also an improvement, making a much stiffer support than wood, and I know of no better temporary turntable for a load of 50 tons. Mr. Johnson also gave us a better "one beam" turntable platform than had yet been produced.

What is commonly known as the "Prairie" turntable is shown in fig. 3. It requires but shallow drainage, the masonry is inexpensive, the table is portable, and can be moved from place to place without much trouble, as it becomes necessary to move the turntable, as track-

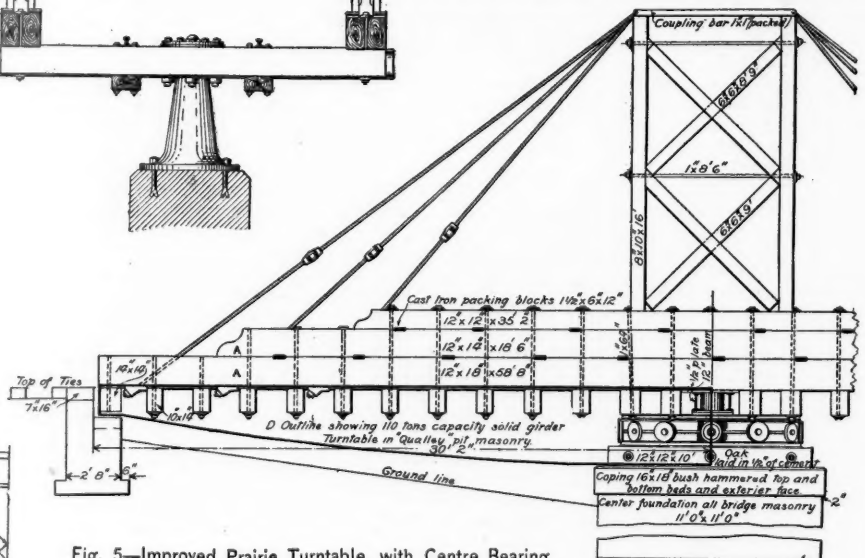


Fig. 5—Improved Prairie Turntable, with Centre Bearing.

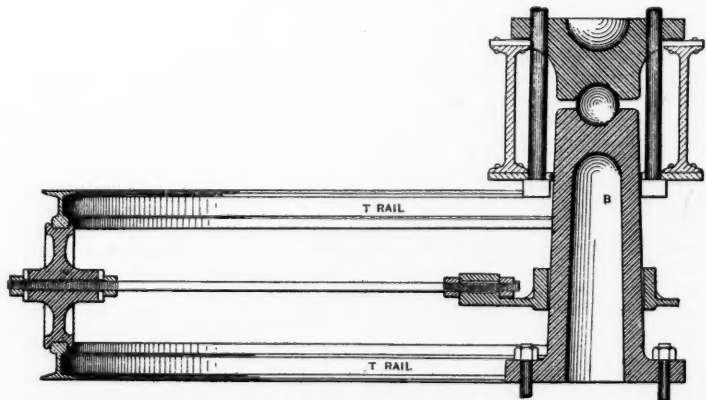


Fig. 5a—Centre and Roller Bearing, Improved Prairie Turntable.

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to raise the table higher and higher until there would be three or four inches space between the circular track and the end supporting wheels, when it was dangerous to run a locomotive onto the table, and in some cases these tables have capsized, locomotive and all.

The average life was from five to eight years, but the wood work could be cheaply renewed, and some were kept in use much longer.

I do not know who designed this turntable, but it is certainly the best model and most economical construc-

laying progresses. This design, however, being a through table, cannot be made to work well, for it is impossible to make the two beams work in unison, or to make the platform act as "one beam;" because the floor beams are the only bracing that the platform has, and they do not

brace vertically. This design of platform will always give trouble in turning, whether the construction is of iron, or wood, because the diagonal deflection cannot be prevented.

Another serious objection is that when made of wood the outer ends will curl up as the truss rods are tightened, making too much space between the circular track and the end wheels, giving the same trouble described in the first table shown. This defect has been remedied in some instances by reinforcing the girders on top with other shorter girders. See "A A" in fig. 4.

A turntable with the circular track reduced in diameter to 9 ft. is shown in fig. 4. The serious trouble with this design is, that it has no centre bearing for the vertical load, and nothing to keep the platform central with the circular track. The diagonal deflection, described fig. 3, added to the defect of having no common

sented in 1840. About one hundred of these turntables, all furnished prior to 1873, are in use on 40 railroads, and for the load intended they have given good satisfaction.

The mistake in this design is that the whole platform, when in place, acts as one immense casting, with the four long arms as levers, the centre box is subjected to extra torsional strain, and the platform finally breaks, generally at the centre. The "one beam" principle is correct, but a platform that is entirely inflexible will not do. Testimonials for these tables are very high as regards the time that they have done good service compared to the expense of maintenance. The rolls and housings of the centre bearing were made of good tool steel (not tempered), and where they were kept free from dust and kept well oiled (once or twice a year) they have lasted 20 years. They have 15 conical rolls, $2\frac{1}{8}$ in. long by $2\frac{1}{8}$ in. diameter on large end, and

in. The two continuous girders forming the platform were connected to each other by a large cast iron centre box bolted directly to the girders—see fig. 7. This construction made the whole turntable platform so rigid that the cast iron members had no chance to adjust themselves to the shock caused by the locomotive going on or off the table.

All engineers admit that a turntable cannot work properly unless it is on an unyielding foundation, and yet some of these tables on first class roads happened to get on poor foundations. We cannot be too careful on this point, and if any doubt exists as to solid bottom, piles should be driven on which to place the masonry.

Mr. H. L. Clarke, Chief Engineer of the Illinois Central, in 1870 put in one of these tables (50 ft. long) in the lake for the Weldon shops at Chicago, Ill. He placed the foundations, both for centre post and circular track,

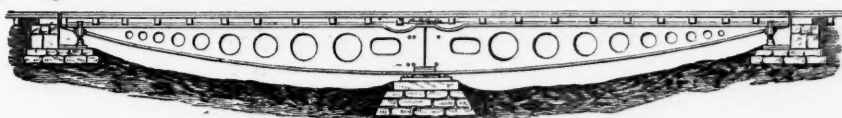


Fig. 6.

THE FIRST GREENLEAF TURNTABLE, made from 1860-1873.

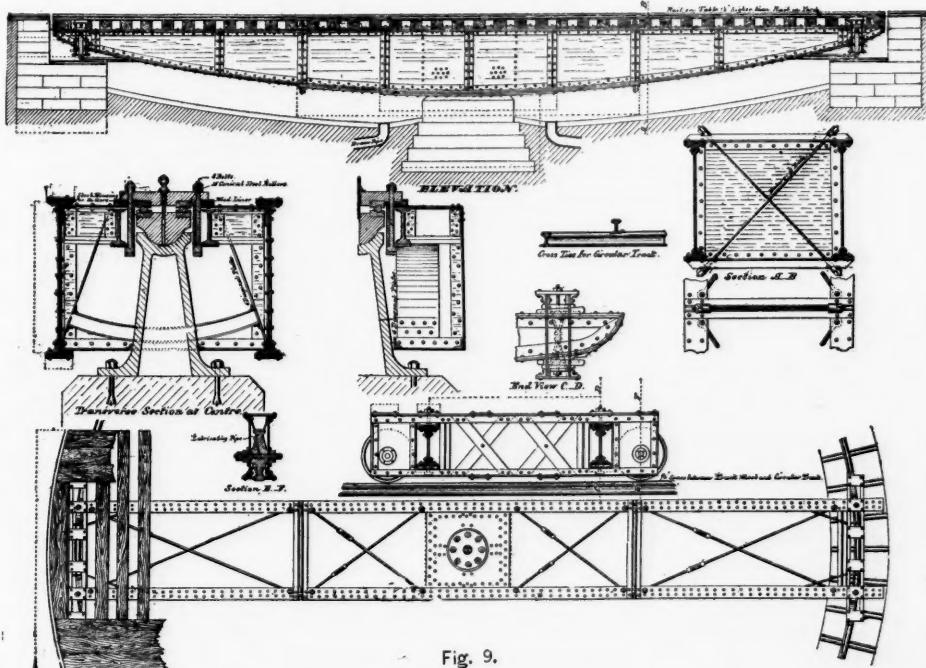


Fig. 9.

RIVETED GIRDER 66-TON TURNTABLE, 1878.

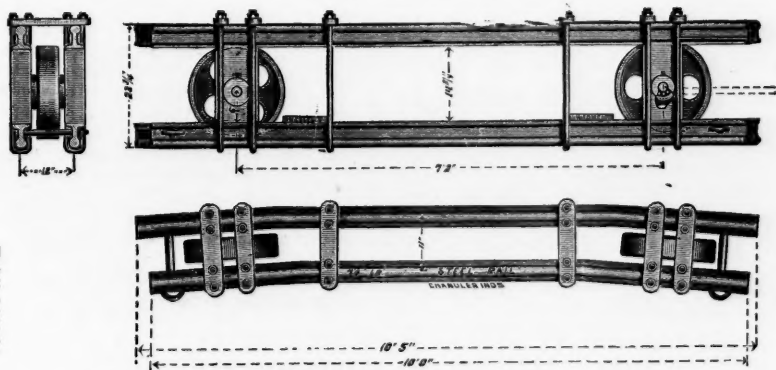


Fig. 10—Repaired End Carriage, 1878-1881, for Riveted Turntable.

centre for table and support, allows the table to "lurch" when the load is coming on it, which brings undue strain on the roller-bearing, and causes the rollers and track casting to break.

An improvement on fig. 4 is shown in fig. 5. The centre post takes half the vertical load off the rollers, and the ball and socket joint at the top holds the platform central with the circular track, and prevents the "lurching" motion referred to in fig. 4. "T" rails have been substituted for the cast iron spiders that usually form the circular track in this kind of table. The line D illustrates the solid girder iron table, that could be placed on the same pit masonry (provided said masonry is substantially made, as is the case with some roads that use this design). Iron cross ties only one-half inch thick would have to be used, instead of the wooden ties, to get the "one beam" iron table in place of the wooden table, and make no changes in the pit masonry. Some have made iron tables a combination of the through table and the girder table, using a 30-in. girder trussed over head on the "gallows frame" plan, but the girders are so far apart and the 30 in. too shallow to get satisfactory vertical bracing to prevent the diagonal deflection.

Fig. 6 illustrates the first "Greenleaf turntable," pre-

$1\frac{1}{8}$ in. diameter on the small end; two tool steel discs for housings 15 in. diameter by $2\frac{1}{2}$ in. thick; eye bored to $5\frac{1}{2}$ in. diameter, with annular groove for conical roller path $12\frac{1}{2}$ in. greatest diameter, $7\frac{1}{8}$ in. small diameter, beveled to proper angle. These rolls have no axles, but run free in the annular groove. The large centre box that connected the girders (see fig. 7) to each other has been renewed in nearly all these tables, and where they have been placed on unyielding foundations below the first line they are working as well to-day as when first put into use in 1860, except where the centre foundations gave way or where the circular track froze out of level and caused the end wheels to bear too hard on the circular track, which would make the table turn hard, and sometimes break the end carriages.

The girders were from 50 to 60 ft. long, 42 in. deep at the centre, top flange straight, lower flange—form parabola—web $1\frac{1}{2}$ in. thick. These girders connected at the centre joint (which is played) are fastened together at the top with a tie bar $3\frac{1}{2}$ in. square having two "T" heads; shoulders, the same section as the tie bar, keyed firmly to place, with two steel keys. The lower flanges are fastened together with tie bar $2\frac{1}{2}$ in. diam. keyed in place with two keys 8 in. long, 3 in. x 1

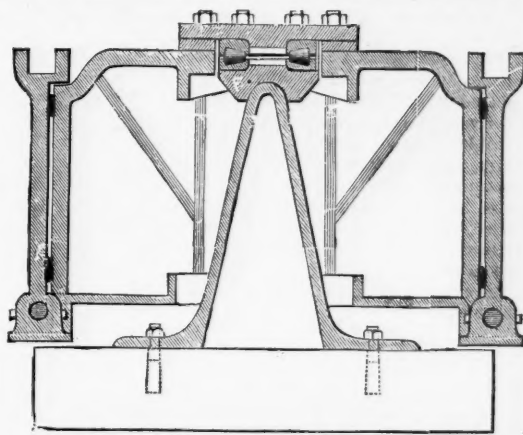


Fig. 7—Centre of First Greenleaf Turntable.

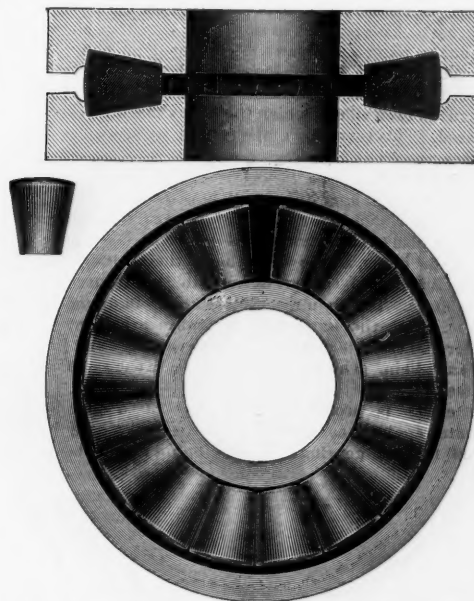


Fig. 8—Centre Rollers of First Greenleaf Turntable.

THE EVOLUTION OF THE RAILROAD TURNTABLE.

on piles 24 ft. long, driven 2 ft. apart centres. The whole thing was in the water when put in place, and filled in afterward. This turntable turned on an average 100 engines daily for 20 years and never gave any trouble. It is now a good turntable, but too short for that place and has been moved to Water Valley, Miss. I attribute this excellent record to the good foundations Mr. Clarke put it on, and the care that it must have had from the mechanical department.

In my opinion, the civil engineer should be responsible for the masonry for turntables, and when the tables are in place the maintenance should be turned over to the mechanical department.

The base of the centre foundation for these tables was 8 ft. square; centre cap stone, 5.5 ft. square by 18 in. thick; total depth about 4 ft. 6 in., or to solid bottom. The table was suspended on eight bolts $1\frac{1}{2}$ in. diameter. The weight of a 50-ft. turntable, without cross ties or rails, was 25,000 lbs. They would now cost about \$800, but are too light for present requirements. They were intended for 40 tons capacity.

Fig. 9 illustrates the first wrought-iron turntable presented by my firm, which was placed on the market in 1878. It was furnished for a 66-ton safe load, but we made the usual mistake of using bridge strains for a turntable.

The top and bottom flanges of a turntable are brought into both compressive and tensile strains every time the load passes on or off the table, which causes every rivet in the girders to receive a reciprocating shear strain, and they all get loose in time—the same as the connecting rivets in the floor beams of a bridge. The rivets are put in hot with more or less scale and dirt on them, the

shoulders of the rivet heads holds this foreign matter from escaping, and if the pressure always comes on the same side it probably settles in one place and serves about as well as the iron; but the peculiar strains to which a turntable is subjected soon detaches this foreign matter and so loosens the rivets. I have cut rivets out of turntables that had only been used a few years that were loose and polished. Riveted turntables that only deflected about $\frac{1}{4}$ in. when new, after ten years' service deflected $2\frac{1}{2}$ in. A riveted turntable after it becomes flexible from use works like wooden tables after they become flexible.

A centre bearing turntable is a cantilever, and should have enough rivets and section to swing the table and load clear of the end supports, not only when the table is new, but after 20 years' hard service. If purchasers when ordering tables would consider the whole length of the table as one span, instead of two, and add for the described reciprocating strains, they would be willing to pay a better price and get a more substantial turntable. Any centre-bearing turntables with riveted girders that are strained as bridges will soon become combined "rim" and centre bearing tables, and most light riveted turntables are that from the first. The turntable illustrated in fig. 9 was theoretically strong enough, but in practice was not satisfactory, and we unfortunately sold about 100 of them to our best customers. The centre connections broke, the end carriages "curled up" and finally sheared off, and the whole structure proved too light for severe service. Some of these tables have been repaired—see figs. 10 and 12, but the expense is nearly as great as to purchase new turntables.

(To be continued.)

Compressed Air Shop Crane.

Mr. D. Hawsworth, Superintendent of Motive Power of the Burlington & Missouri River Railroad in Nebraska, has designed and built a compressed air traveling crane, which we illustrate and which comprises many interesting features. This crane is in use at the Havelock shops of the above named company. The machine shop in which it is placed is 400 ft. long and has a standard gauge track extending throughout the length of the shop and on each side of which the heavy machine tools are placed. This traveling crane is used to serve these machines as well as for bringing material into the shop and taking it out.

Referring to the engravings it will be seen that the compressed air is stored in a cylindrical reservoir standing on the car, also in three horizontal tubes at the upper part of the crane, as shown in the sectional elevation, and the interior of the mast and jib is also used as storage space. The main reservoir is 42 in. in diameter and 8 ft. high, the horizontal air tubes are 9 in. in diameter and the internal diameters of the mast and jib, are 13 and 10 in. The total air storage capacity is 85 cubic feet.

The crane is propelled by means of a pair of horizontal engines connected with the front axle by grooved friction gearing. The swinging motion is ob-

which are conveniently located at the side of the mast, the connections being made by pipes and

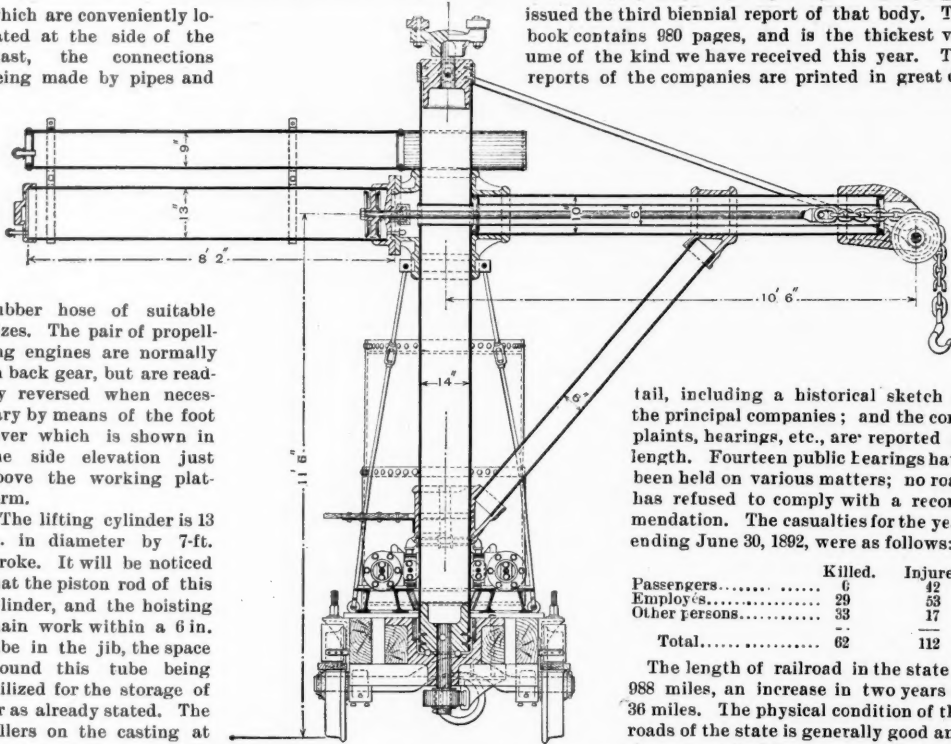
rubber hose of suitable sizes. The pair of propelling engines are normally in back gear, but are readily reversed when necessary by means of the foot lever which is shown in the side elevation just above the working platform.

The lifting cylinder is 13 in. in diameter by 7-ft. stroke. It will be noticed that the piston rod of this cylinder, and the hoisting chain work within a 6 in. tube in the jib, the space around this tube being utilized for the storage of air as already stated. The rollers on the casting at the top of the mast ordinarily rest against a channel iron which is fastened to girders in the shop and serve to steady the crane when serving machines. For outside use, when necessary, there are four adjustable rail clamps as shown in the side elevation.

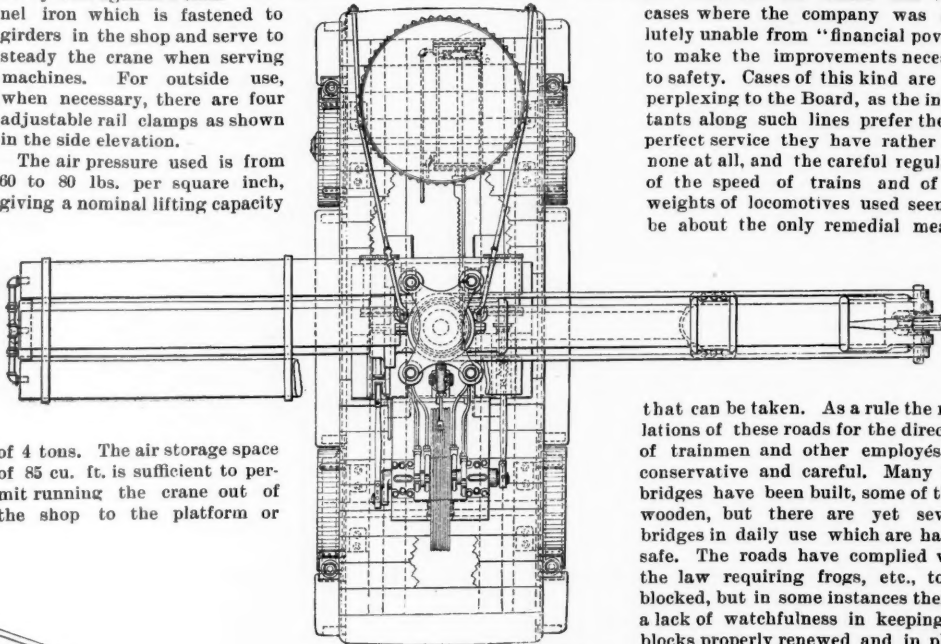
The air pressure used is from 60 to 80 lbs. per square inch, giving a nominal lifting capacity

of 4 tons. The air storage space of 85 cu. ft. is sufficient to permit running the crane out of the shop to the platform or

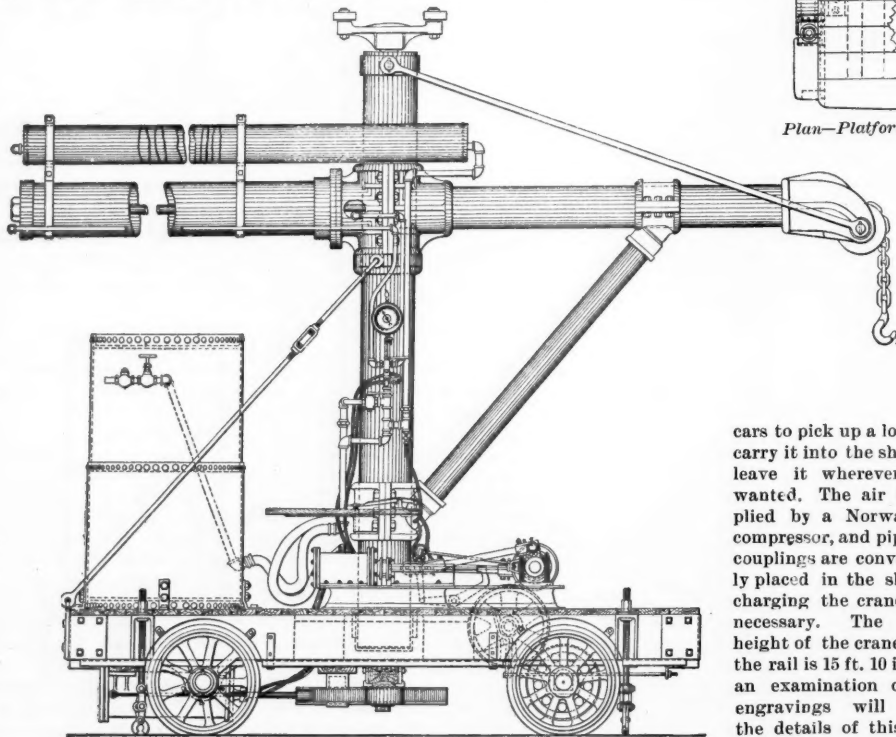
issued the third biennial report of that body. The book contains 980 pages, and is the thickest volume of the kind we have received this year. The reports of the companies are printed in great de-



Sectional elevation—Crane swung at right angles.



Plan—Platform and pipes removed.



Elevation.

Compressed Air Shop Crane—Burlington & Missouri River Railroad.

tained by means of a horizontal cylinder placed below the car frame and connected to the mast by a rack and spur gear. The lifting is accomplished by means of a long horizontal cylinder in line with the jib. The supply of air to these cylinders is controlled by three-way cocks

for lifting purposes in railroad shops.

Vermont Railroad Commissioners' Report.

The Railroad Commissioners of Vermont, Samuel E. Pingree, Amory Davison and Leon G. Bagley, have

tail, including a historical sketch of the principal companies; and the complaints, hearings, etc., are reported at length. Fourteen public hearings have been held on various matters; no road has refused to comply with a recommendation. The casualties for the year ending June 30, 1892, were as follows:

	Killed.	Injured.
Passengers.....	6	42
Employees.....	29	53
Other persons.....	33	17
Total.....	68	112

The length of railroad in the state is 988 miles, an increase in two years of 36 miles. The physical condition of the roads of the state is generally good and shows a marked improvement, but in a few instances the Board has found cases where the company was absolutely unable from "financial poverty" to make the improvements necessary to safety. Cases of this kind are very perplexing to the Board, as the inhabitants along such lines prefer the imperfect service they have rather than none at all, and the careful regulation of the speed of trains and of the weights of locomotives used seems to be about the only remedial measure

that can be taken. As a rule the regulations of these roads for the direction of trainmen and other employees are conservative and careful. Many new bridges have been built, some of them wooden, but there are yet several bridges in daily use which are hardly safe. The roads have complied with the law requiring frogs, etc., to be blocked, but in some instances there is a lack of watchfulness in keeping the blocks properly renewed and in place. Concerning automatic freight car couplers and air brakes, the report points out that an individual state can do nothing until national legislation takes shape. All of the principal roads heat their passenger trains by steam from the locomotive, but the Central Vermont has only about one-third of its cars fitted, and the Upper Coos only three-fourths. The report is accompanied by a good map of the state. The Board recommends the passage of laws to compel the use of warning fixtures at overhead bridges, and to require all passenger and mixed trains to have bell cords. The notes taken on inspection trips are printed in full, as also the reports on accidents.

A Rack Railroad in Syria.

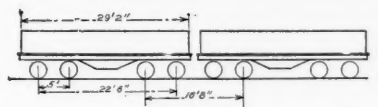
Following close upon the opening last September of the Jaffa-Jerusalem railroad comes the announcement that a second railroad is soon to be built in Asia Minor, to connect the port of Beirut with Damascus. The line will be 87 miles long, 18 $\frac{1}{2}$ miles of which will be equipped with rack rails on the Abt system. Work on the plans has been going on for the past three years. Of the general features of the road Mr. A. Schneider recently spoke before the Verein Deutscher Eisenbahnverwaltungen. This project, as now worked out, provides for a road to begin at Beirut, only a few yards from the Mediterranean. Thence it is to pass over about three miles of practically level land. Beyond this the mountain ascent is to be made over a distance of about 17 miles, the top of the mountain range being reached at an elevation above the sea of 4,822 ft., representing an average grade of about 295 ft. to the mile. From the mountain tops there is to be a down grade to Maallaka at an elevation of about 3,000 ft. Maallaka is 60 kilometres distant from Beirut, and 80 kilometres from Damascus. These last 80 kilometres will not be laid with rack rails, although this section will have occasional heavy grades. The gauge of the road is to be 42 in. The cost of the road has been estimated at about 30,000,000 francs. Earth work was commenced last August by a French contractor, and it is expected that the line will be given over to traffic during the summer of 1895. The locomotives will be built at Winterthur, Switzerland, and the rack rails will be turned out at the Dortmund Union Works all under the supervision of Mr. Abt.

cars to pick up a load and carry it into the shop and leave it wherever it is wanted. The air is supplied by a Norwalk air compressor, and pipes and couplings are conveniently placed in the shop for charging the crane when necessary. The total height of the crane above the rail is 15 ft. 10 in. As an examination of the engravings will show, the details of this crane have been very carefully worked out, and it is an excellent example of the use of compressed air

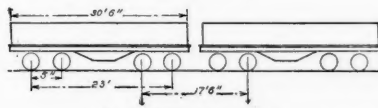
Metal Ties and Track Maintenance.

Reference has already been made in *The Railroad Gazette* to the discussion of the question of cost of maintenance of track laid on metal cross ties, by Mr. Wilhelm Ast, of the Kaiser Ferdinand Northern railroad of Austria, at the recent International Railroad Congress held at St. Petersburg. In a late issue of the *Zeitschrift* of the Austrian Engineers' and Architects' Society the subject is further treated of by Mr. Ast, who refers to published data concerning the use of metal ties of the Post and Braet types on the Belgian state railroads. The results were not favorable there to the metal ties, and now, after a five years' experience with them, the ties are being removed in large numbers and replaced by wooden ones. It would seem also that no further trials are to be made with them, at least for the present. These facts Mr. Ast regrets especially because of their announcement just now when attention is centred in the performance of metal ties, and when disappointment with them in any quarter is apt to create an unfortunate and unwarranted prejudice.

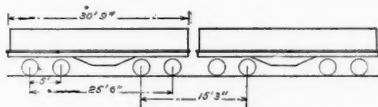
Mr. Ast refers to a report on the subject by Mr. A. M. Kowalski, Chief Engineer of the Bone-Guelma Railroad, of the French Algerian system, according to which 74,851 kilometres, or about 46,432 miles, of track is laid on metal ties. The cost of maintenance of a mile of road with wooden ties, according to Mr. Kowalski's figures,



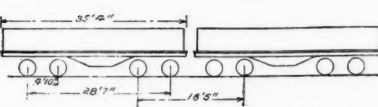
Pennsylvania.



East Tenn., Va. & Ga.



Chesapeake & Ohio.



Philadelphia & Reading.

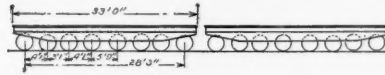
is to the cost of maintenance of a mile of road with metal ties as 1 to 0.60. Mr. Ast then explains the favorable view taken of metal ties at the St. Petersburg congress by the fact that, notwithstanding the unfavorable Belgian records, the experience of his road, the Kaiser Ferdinand Northern, with metal ties extended over a longer period, about nine years, and was satisfactory in every respect. They used ties of the Heindl pattern, and had carefully compared during the nine years the cost of maintenance, on two parallel experimental sections of line, of both the wooden and the metal ties. The result, as intimated, showed a decreased expense account for the metal tie section and further that, after the full period of nine years, the iron ties were still practically as good as new, while the oak ties which were used showed considerable deterioration, notwithstanding the fact that they had been treated with zinc chloride. Attention is drawn to the fact that the traffic conditions on both of the experimental track sections were practically the same, and a fair comparison could thus be made. Tabulating the observations recorded during the trial period, Mr. Ast shows that the actual saving in cost of maintenance per mile in favor of the iron ties was 13.8 per cent. Similar results are said to have been obtained with Heindl iron ties on the Bavarian state railroads, on which, during the interval from 1883 to 1891, 394 kilometres of track were laid with them, the intention being to use them still more extensively as tie renewals became necessary.

The unsatisfactory results on the Belgian roads Mr. Ast ascribes entirely to the use of defective and unsuitable details, such as the rail fastenings, and to the use of unsuitable material. He directs attention particularly to the important preservative influence exercised on the life of both wooden and metal ties by the use of tie-plates. Where these are omitted, as they were on the Belgian roads, the rail fastenings get loose, and a constantly increasing hammer action of the rail on the tie is produced. So far as the quality of the material is concerned, Mr. Ast remarks that much depends upon the character of the steel for the ties and the road ballast. Of the quality of the steel, unfortunately, nothing was said in the report on the Belgian ties, except that the metal was not soft enough, shown by the fact that in punching holes in the ties hair-cracks were produced. To these the tearing out of the fastenings is

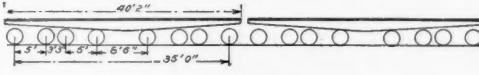
ascribed.* The Post and Braet ties, as used on the Belgian roads, are made comparatively heavy in section at the rail seats so as to make up for the lack of tie plates, and the tendency for cracks to form around the holes punched at those points was specially pronounced. In the later specifications for these ties it was accordingly required that the holes be drilled instead of punched.

The rapid destruction of the roadbed proper observed in Belgium on those sections on which the metal ties were laid, and the correspondingly large quantities of ballast required to keep it in good condition, are attributed, as already intimated, to the generally unsatisfactory character of the construction details. Mr. Ast, therefore, protests against arriving at a generally unfavorable decision as regards metal ties, since their failure in this instance was due to special, though none the less valuable, conditions—valuable because of the instructive lessons which, he thinks, they taught.

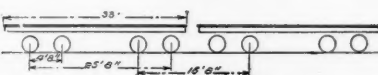
One other reason why the metal ties made an unfavorable showing on the Belgian roads is, according to Mr. Ast, found in the circumstance that the cost of maintenance of those road sections which had wooden ties was placed abnormally low, the cost of ballast, for example, not being taken into account at all, while on those sections with metal ties it figured as a very important item. The experimental Belgian road section was only 822 metres long. On this section, with a daily traffic of 58 passenger and 43 freight trains, the expense account for maintenance with wooden ties, for three successive years, is placed at zero in the report of the Belgian authorities. During the fourth year 85 working-hours were devoted to repairs. On the Kaiser Ferdinand Northern road, with which Mr. Ast is connected, the expense account for repairs where wooden ties are laid is at least twelve times as great as in the Belgian instance cited. Then, again, a trial section of road only 822 metres long is not long enough, nor is an experience extending over only five years enough to give conclusive data. Comparing all the facts available from his observations in Austria with



Pennsylvania.



Pennsylvania.



Baldwin Locomotive Works.

Diagrams of Cars to Accompany Table of Weights.

those obtained in Belgium he concludes that there is little doubt of the superiority of the metal tie over the wooden one, and advises that reports adverse to metal ties should be very carefully sifted before finally judging as to the relative merits of the two kinds of ties. Where such careful examination is made, he thinks, it will generally be found that too little attention has been given to some apparently unimportant structural details, which, in the end, make all the difference between success and failure.

Weights and Dimensions of Certain Freight Cars.

Mr. J. Kruttschnitt, General Manager of the Southern Pacific Company, Atlantic system, has collected some data regarding the comparative weights per running foot of box and gondola cars and gun trucks, which are given in the accompanying table. The cuts show the general designs of the cars.

WEIGHTS AND DIMENSIONS OF CERTAIN FREIGHT CARS.

Railroad.	Kind of car.	Weight empty.		Capacity.	Total loaded weight.		Weight per ft. of total length.	Weight per ft. of total wheel base.	Weight per ft. of truck wheel base.	Weight per ft. of wheel base of two adjacent trucks.
		Lbs.	Lbs.		Lbs.	Lbs.				
Pennsylv'a.	Hopper bottom gondola.	23,200	60,000	83,200	2,853	3,698	8,320	4,992		
	"	25,000	50,000	75,000	2,450	3,268	7,500	4,286		
	"	24,000	60,000	84,000	2,732	3,204	8,400	5,509		
Pennsylv'a.	Gun truck.	22,800	60,000	82,800	2,343	2,885	8,372	5,018		
	Flat car.	36,100	80,000	116,100	3,518	4,110				
	"	31,800	100,000	131,800	3,779	4,358				
Bd'win L. Works.	"	24,000	70,000	94,000	2,849	3,663	10,080	5,610		
	"	28,000	60,000	88,000	2,400	2,983	8,653	5,074		
	"	23,500	50,000	73,500	2,390	3,063	7,602	4,477		
S. Pacific.	"	27,000	50,000	77,000	2,095	2,678	7,962	4,358		
	"	30,000	60,000	90,000	2,400	2,849	9,000	5,622		

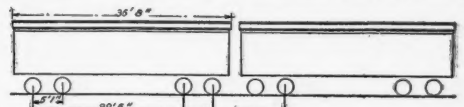
* See an admirable paper by Mr. H. K. Bamber, *Railroad Gazette* July 22, 1892, for a discussion of the properties of steel for tie.

The National Switch & Signal Company.

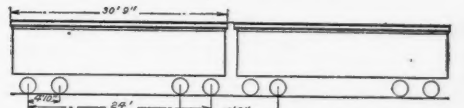
The last general account that we gave of the works and business of the National Switch & Signal Co. was in September, 1880. The company has been in business ever since, however, and has made a substantial place for itself in the interlocking and signaling business. It is now building new shops at Easton on the left bank of the river, its present shops being on the line of the Lehigh Valley, on the right bank. The new shops have been designed by Mr. Pascoe, Superintendent of the National Switch & Signal Co., and for some years Superintendent of Bridges on the Lehigh Valley Railroad. They will consist of the following buildings: Main building, which will include offices, machine and erecting shop, pattern shop, electrical shop, boiler and engine room, dimensions 80 ft. x 400 ft.; store room 40 ft. x 150 ft.; foundry, 40 ft. x 170 ft.; blacksmith shop 40 ft. x 100 ft.

The interlocking work of this company is at present the most important part of its business. In the year 1892 the interlocking machines turned out aggregated 727 levers, and these included, of course, all of the usual parts, such as lead-out, ground connections, semaphore signals, etc.

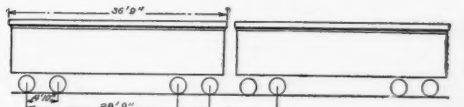
The National interlocking machine is, as is probably well known, the Stevens' mitre locking, the locking being in a vertical plane and actuated by tappets hung



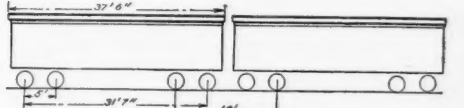
Louisville & Nashville.



Southern Pacific.



Southern Pacific.



Pennsylvania.

from rockers. Mr. George H. Pfeil, Chief Engineer of the company, has designed some improvements which have been introduced in the later practice of the company. One of these is an ingenious special lock movement, and another change, which is found to be economical where very heavy locking is to be done, is the use of two tappets with each rocker, one hanging down in front of the machine and one behind it. This makes it practicable to use two sets of locking and thus double up the locking room. The company has now in the shop a 92-lever machine for the Illinois Central at Twelfth street, Chicago, and has recently shipped an 80-lever machine for the same road at Forty-third street, in Chicago. Another machine now in the shop is one of 28 levers for the Norfolk & Western.

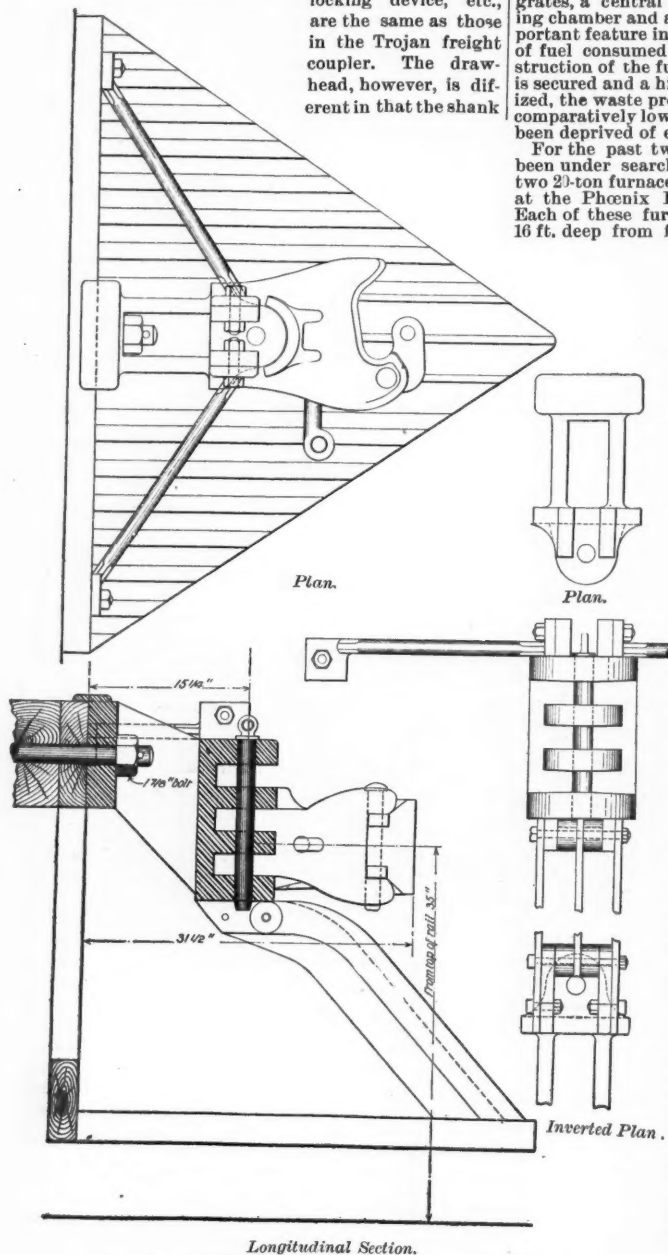
The company has several specialties in interlocking work which are well known, but some of which have been improved recently. One of these is the Palmer torpedo placer, which is now called the National Repeating Torpedo Signal. This has had some decided improvements, which we hope to show very soon. The Mitchell & Stevens double wire compensator was illustrated in the *Railroad Gazette* some years ago. This is said to be giving good satisfaction among the customers of the National company. The company has also a good selector and some specialties in the way of lead out work. The Koyle parabolic semaphore is, of course, too well known to need anything more than mention here. So far as we can learn, this continues to give satisfaction to those who have used it. The company still uses an aluminum reflector for this semaphore.

The latest and perhaps most important novelties to be seen at the shops of the National company are Lattig's automatic electric semaphore block system and his electric slot. The latter was shown in the *Railroad Gazette* a few weeks ago. It is a device for doing precisely what the Sykes slot does, and may be worked either with track circuit or wire circuit. If this is found in actual service to be durable, reliable and efficient, it ought to have a field, for it is considerably simpler than the Sykes. Mr. Lattig is developing a block system to be worked automatically by either a track circuit or wire circuit as wished. This system will work a full size outdoor semaphore, the semaphore to be operated by battery current and a motor on the post. Each signal is independent so far as the power for working the

semaphore goes. Of course everybody knows how desirable it is to use a semaphore for block signaling if it can be made thoroughly reliable and practicable in automatic work; and everybody knows also how desirable it is to have a comparatively cheap and easily maintained source of power for operating the semaphore. Whether or not Mr. Lattig has succeeded in overcoming the difficulties that other people have found in working a semaphore by an electric motor on the post, we cannot pretend to judge now, but we shall certainly be very much interested to see the outcome of his experiments. Some of these signals are to be installed at once on a short section of one of the Eastern trunk lines where there is a heavy traffic.

A New Locomotive Coupler.

The engravings show a new device recently put on the market by the Trojan Car Coupler Company, of Troy, N. Y., for use on locomotives and tenders. The knuckle locking device, etc., are the same as those in the Trojan freight coupler. The drawhead, however, is different in that the shank



The Trojan Car Coupler on Locomotives and Tenders.

is shorter and broader, and is provided with a pivot hole through which it is secured to a suitable draw casting having lugs which fit corresponding recesses in the coupler shank, as shown in the accompanying illustrations.

The advantages of this arrangement of a coupler for use on locomotives and tenders are, that it allows sufficient play of the drawhead on the pivot to insure coupling on any curve, and that in case a knuckle is broken it is not necessary to throw the whole coupler into the scrap heap, as in the use of tender couplers in which the knuckle and drawhead are cast in one piece. The coupler on the car next to the tender is sometimes inoperative, and if a solid hook is used on the tender the locomotive cannot be detached without removing the coupler on either the tender or car. But with the device here illustrated both couplers must be inoperative to require the removal of one to detach the locomotive.

The coupler is carried and held in a central position for coupling through gravity, by inclined planes on the central and lower lugs of the draw-casting with corresponding services on the coupler shank, upon which the coupler must be raised, whenever moved away from the centre, and upon which it swings back to the centre when released.

The illustrations show a convenient method adopted by a prominent railroad for front of locomotive, where the construction of the pilot will permit. Slight modifications of this arrangement are used where a spring buffer is desired for passenger service. The shape of the ordinary draw-casting can also be adapted for use in freight service, the back being altered to fit any tender.

The Bates Steel Process.

The following account of the Bates process for the conversion of low-grade steel into high class tool steel we take from the columns of our London contemporary, *Iron*. It is the invention of Mr. Francis Gordon Bates, of Philadelphia, and is based on the cementation principle, although it is carried out in a distinctly different manner, with a special carbonizing composition and in a specially constructed furnace. The process consists, firstly, in packing the steel in this carbonaceous compound in the converting chamber of the furnace. This chamber is air tight, and the entrance to it is bricked up before the fire is started. The furnace has three fire grates, a central one immediately beneath the converting chamber and a smaller one on either side. One important feature in this furnace is the very small amount of fuel consumed per ton of steel converted. The construction of the furnace is such that perfect combustion is secured and a high heat produced, which is fully utilized, the waste products of combustion passing off at a comparatively low temperature and not until they have been deprived of every particle of their calorific value.

For the past twelve months the Bates process has been under searching practical trial in this country, two 20-ton furnaces having been erected for this purpose at the Phoenix Engineering Works, Stoke-on-Trent. Each of these furnaces is 12 ft. high by 12 ft. wide and 16 ft. deep from front to back. A number of charges, amounting to many tons of steel, have been treated by Messrs. Renshaw & Son, the proprietors of the Phoenix Works, and they have used the steel so converted for making turning tools, punches and chisels, which they have employed in their own establishment on general work with unqualified success, as we ourselves have witnessed. Beyond this, Messrs. Renshaw have supplied the proprietors of other engineering works with bars of the converted steel, which have been made into tools, and tested in use by them, and reported upon most satisfactorily.

A turning tool was put to work to redress the tire of a well traveled railway wagon wheel, the skin of which was very hard and dense owing to heavy use. The tool made very light of it, taking two good cuts off the tread without regrinding. Another similar tool was put to a wagon wheel with a still denser skin, as the turnings showed, and it took 5 1/2 in. off the tread and flange before it required regrinding. As regards the punches, a number of these, both round and square, were tried with the best results. Some of the rounds were set to punch plates equaling and exceeding in thickness their own diameters, and they accomplished their work most satisfactorily. A very important point here arises as to what amount of work tools made from the same steel before conversion would do. In order, therefore, to institute a comparison between the behavior of the steel before and after treatment by the Bates process, a tool was made from the untreated portion of the bar from which the tool last referred to was made. It was put to work on a softer wheel than the companion treated tool, but gave out in a very few minutes. The same thing occurred with a tool made from the untreated portion of another bar, the tool made from the treated portion doing excellent work. It will at once be admitted that the tests of the converted steel were of a crucial character, for we need hardly point out that work such as these turning tools did is always done by tools of Mushet steel. This steel, as is well known, costs £7 per cwt. or £140 per ton, while the steel converted and tested by Mr. Nursey costs, on the average, £7 5s. per ton, and its selling price will probably be about £2 16s. per cwt. or £56 per ton.

It will thus be seen that we have here a new and an important departure in steel making, and one which is not only a practical success but a commercial manufacture. No pains have been spared by the syndicate to test the process thoroughly in both these respects, and from what we have seen we are bound to admit that they have succeeded in establishing the fact that they can economically convert steel containing a low percentage of carbon into steel of a very high class well suited to the purposes we have indicated. Nor is this all, inasmuch as by the same process wrought iron and, equally well, cast iron can be converted.

A Cold Bath.

On the night of Jan. 25, while a freight train, engine 580, was on the transfer steamer "Tacoma," crossing the Columbia River at Kalama, Wash., 40 miles north of Portland, Or., about mid-stream the boat struck a lot of drift logs and ice, causing her to lurch sufficient to start the engine, and before it could be stopped it went over the end of the boat into the river. The crew escaped and no damage was done to the boat or the cars.

Strengthening Bridges While in Use.

Alois Schneider, Assistant Engineer of the Kaiser Ferdinand Nordbahn, of Austria, has contributed to the *Zeitschrift of the Austrian Engineers' and Architects' Society* an account of a method devised by him for re-enforcing bridges without necessitating their temporary withdrawal from regular use.

He starts with the proposition that the necessity of strengthening bridges, particularly railroad bridges, without interrupting traffic, has steadily grown in importance, keeping pace, in a measure, with the constantly increasing weights of rolling stock; but, at the same time, there is more or less distrust among engineers of the efficiency of re-inforcements made under such conditions. The reasons for this, Mr. Schneider presents as follows: If a bridge be left in its normal position, unsupported except as under ordinary conditions, while the work of re-enforcing is being carried on, then the strengthening members which, of course, are not under any strain, are connected with the old

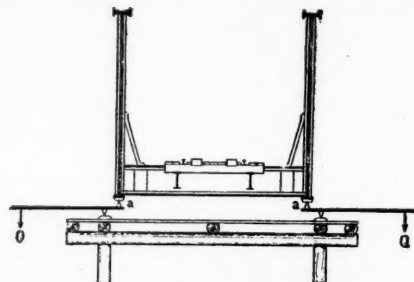


Fig. 1.

bridge members which are under some strain, due to the dead weight of the bridge itself. If now additional weight be thrown on the bridge, by the passage of a train, for example, the result will clearly be that the original members will be strained considerably more than the newly added members. It may be gathered from this that in one and the same bridge-member there may be component parts under strains of widely varying magnitudes, and it may, therefore, happen that the old parts are strained fully up to, if not beyond, the permissible limit, while the new parts are only under very light strains. From this, continues Mr. Schneider, it is evident, that with the bridge unloaded, the new re-enforcing members constitute simply useless dead weight. With a live weight on the bridge, on the other hand, they never reach a state of full effectiveness, and, consequently, cannot properly be regarded as economical or efficient additions.

This state of affairs could easily be avoided if each bridge to be strengthened were supported on a substantial scaffold, something like the false work used during erection. So supported, the bridge would be practically free from all strain. To accomplish this end, however, it would be necessary to have a supporting

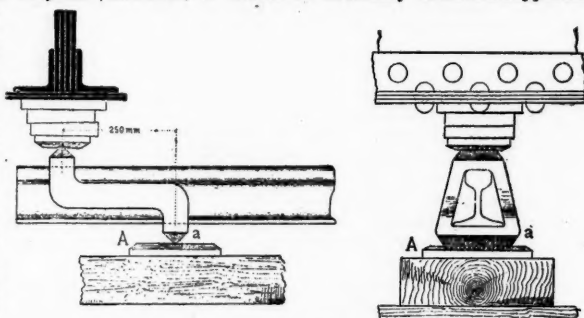


Fig. 3.

frame-work capable of sustaining not only the weight of the bridge itself, but also whatever live load came upon it. Much time and labor also would have to be expended in securing and maintaining proper alignment and adjustment of both bridge and scaffold, and yet there would remain the constant danger of losing such adjustment under the disturbing influence of any passing train. Practically, therefore, this expedient does not commend itself.

Mr. Schneider, accordingly, sought to accomplish the same results in a different way. Briefly, he explains that if we assume an upward re-action to be applied at all those points in a truss at which the dead weight is concentrated, at the lower chord joints, for example, of a main truss with the cross girders, these reactions being equal to the downward thrusts, then we may properly consider the bridge as having no weight, and the whole object sought after is attained. It is not even necessary, however, to apply such a re-action at each joint. The treatment applied to only a certain proportion of the joints will suffice in practice, so as to secure an approximately neutral condition of the bridge. Absolute freedom from strain due to dead weight would, of course, not be secured and, for that matter, would not be indispensable to a satisfactory result. With the bridge in such a comparatively neutral state, the new parts could be connected with the old ones in such a manner as to make both bear proper shares of the strains to be afterward brought upon them.

The neutralizing strains or reactions Mr. Schneider

proposes to obtain by the application of levers which, he claims, would not only readily adapt themselves to this work, but would also admit of easily measuring the applied forces. The fulcrums of the levers he would secure in some suitable substructure as shown in the annexed diagram, fig. 1. The longer lever arms would be loaded with weights *Q Q*, sufficient to give the necessary upward reactions at *a a*. The neutralizing weights could, with this arrangement, be applied very easily and would be under ready control, and as to the weight of the bridge, it would be sufficient if it were known only approximately. Settling of the supporting framework would also be of little moment and would be indicated at once by the positions of the levers. Neutralization of the transverse strains in the trusses could be carried to such an extent that individual members could be completely removed and replaced without unduly endangering the bridge.

The only drawback to the method, which Mr. Schneider can conceive of, is the necessity of having a stable supporting framework instead of the hanging scaffolds frequently employed. As opposed to the latter, however, he makes the point that these, themselves, represent a certain amount of dead weight added to

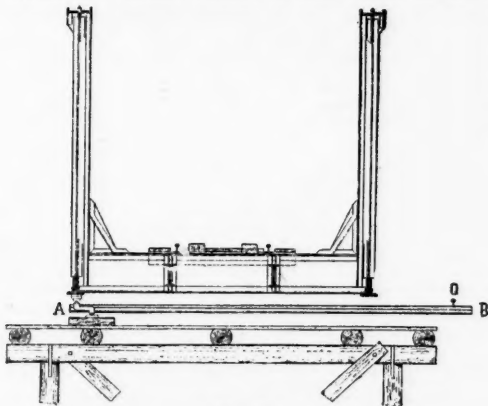


Fig. 2.

that of the bridge, besides affording only scant facilities for the prosecution of the work. On the whole, therefore, he concludes that the greater cost of the independent scaffold is not a serious drawback, but is more than counterbalanced by the advantages of the arrangement.

To show that the method is not simply based on theory and untried, he cites the case of a bridge over the Biala River, on the Kaiser Ferdinand Nordbahn, where it was successfully applied. The bridge has a span of 35.2 metres (115½ ft.), and was reinforced throughout in all its parts. The lever arrangement adopted in this case was of the kind shown in figs. 2 and 3, which explain themselves.

To all of which an American engineer says: "This sounds to me like theory gone mad. The practical Yankee would say that he could do as well by a judicious use of wedges. Still, refined methods of balancing unknown old strains with conjectural new ones please some minds."

Riehle 80,000-Lb. Testing Machine.

The illustration shows a new and very powerful form of spring tester recently designed and manufactured by the Riehle Testing Machine Co. The early forms of spring testers received the spring pressure on a single knife edge and on a single lever, and this required careful adjustment of the spring at the centre of pressure or there was undue side strain and friction on the checking mechanism. Later, a step in advance was made by taking the pressure on two levers in the same line. This lengthened the surface in one direction, but kept the limit rather low in the other direction.

The present machine, being massive in proportions and subject to heavy loads, with a wide range of sizes and kinds of springs, was made with a system of three compound levers, thus distributing the surface of support over a large area and receiving the pressure at three points, which is the theoretically perfect support.

This machine is also made more like the usual type of heavy tensile machines, the main difference being that the supporting pedestals of the levers are inverted and the lever system is counterbalanced and held in position by the top lever and weights, as shown. The upper compression plate floats on springs, which are easily adjusted to just bring the knife edges in contact. The load is applied by raising the lower compression platform which rests on the plunger of the hydraulic cylinder, in the usual manner. This machine is constructed so that the full load can be weighed directly on the beam, or dead weight can be hung at the end of the main lever if desired, while the whole apparatus is self-contained on the same bedplate. The large cylinder shown in the illustration was used in connection with a low accumulator pressure, but where a pump is used a somewhat smaller hydraulic cylinder is supplied.

The machine is furnished with relief valves and all the latest apparatus for convenient and quick handling, and is giving good satisfaction. It is believed to be the heaviest and strongest machine of its kind in the country. It is the intention of the Riehle Testing Machine Co. to have one on exhibition at the World's

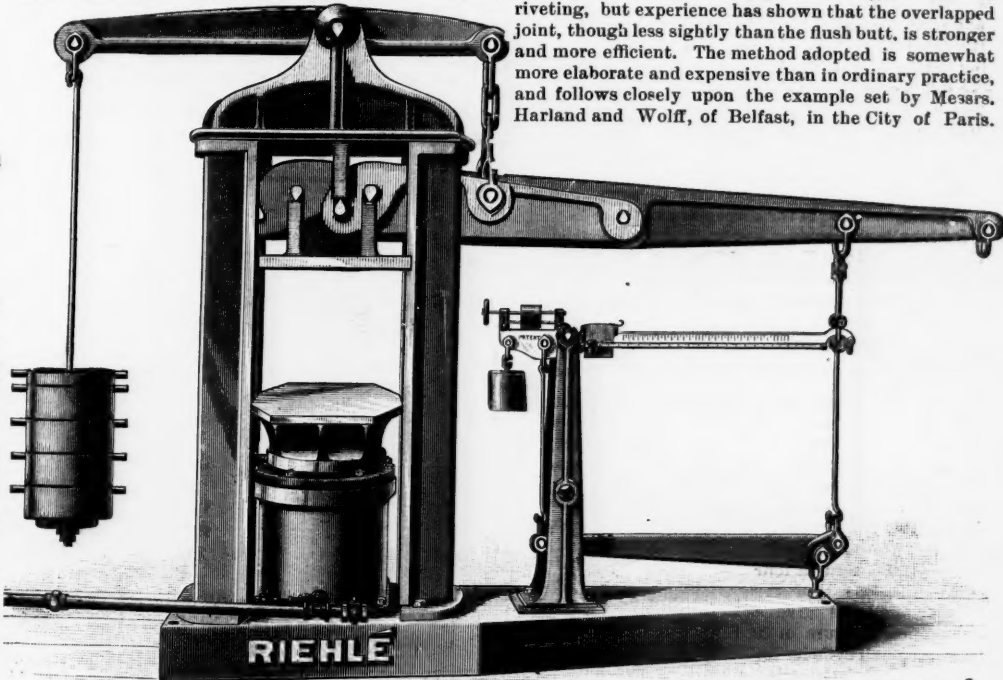
Fair. The one shown here was built for the Detroit Steel & Spring Co. The dimensions are as below:

Extreme height.....	8 ft. 0 in.
Extreme width.....	4 ft. 6 in.
Extreme length.....	13 ft. 0 in.
Weight (including hydraulic pump).....	11,000 lbs.
Compression surface above.....	20 × 24 in.
Compression surface below.....	24 in. × 4½ ft.
Space between surfaces.....	20 in.
Dynamic motion.....	1 in.
Motion of plunger.....	12 in.
Maximum speed of plunger.....	12 in. per min.
Diameter of cylinder.....	8 in.

The Campania and Lucania.

The new Cunard twin screw steamers, the largest merchant vessels in the world, are rapidly nearing completion, and both will be engaged in carrying passengers from Great Britain to the World's Fair. The Campania's engines were turned in dock on the 18th ult., and the Lucania is nearly as far advanced. Hitherto there are afloat only 14 vessels of 6,000 tons and over, and nearly all are engaged in the North Atlantic trade. No less than 35 twin screw vessels of 5,000 tons or over are now running or building.

The Campania is 600 ft. long between perpendiculars, being only 80 ft. shorter than the late lamented Great Eastern, and her beam of 65 ft. is only 17 ft. less. The vessel in actual service most nearly approaching her in length is the White Star Teutonic, which is 566 ft. between perpendiculars, or 34 ft. less, the beam being 8 ft. narrower. The Campania is 73 ft. longer, but only 1 ft. 9 in. broader than the Inman Company's City of Paris and City of New York. Her length over all is 620 ft.;



Riehle 80,000-lb. Spring Testing Machine.

breadth extreme, 65 ft. 3 in.; depth to upper deck 43 ft. and gross tonnage about 12,500 tons. Her displacement will probably be 18,000 tons. The vessel has a straight stem and elliptic stern, top gallant forecabin and poop, with close bulwarks, all fore and aft, and erections above the upper deck consisting of two tiers of deck houses, surmounted respectively by the promenade and shade decks. The monkey bridge is 60 ft. above the water line.

The Campania is fitted with two sets of the most powerful triple expansion engines yet constructed, each set indicating from 14,000 to 15,000 horse power. They are fitted in two separate engine rooms with a dividing centre-line bulkhead between them, fitted with water-tight doors for communication. Each set of engines has five inverted cylinders, viz., two high pressure, one intermediate pressure, and two low pressure cylinders; the two high pressure being placed tandem-wise above the low pressure. These are arranged to work the three cranks set at an angle of 120 deg. with each other. The high pressure and intermediate cylinders are fitted with piston valves and the low pressure with relieved slide valves all worked by the usual link motion. The reversing engines are of the steam and hydraulic direct acting type made by Messrs. Brown Brothers & Co., Edinburgh and fitted with their patent automatic emergency gear calculated to prevent such a disastrous breakdown of the engines as took place on board the City of Paris. The crank shafts are all of the built type, in interchangeable sections, and with the tunnel and propeller shafting, are of mild steel, forged by Messrs. Vicker, Sons, & Co., Sheffield. The condensing water is circulated through the condensers by four large centrifugal pumps, each driven by independent compound engines. These pumps can also pump water from the ship in case of damage to the hull. Four Weir's patent evaporators produce the necessary fresh water from sea water to make up the loss incurred through working, and avoid the use of salt water in the

boilers. There is also a large Weir's feed-water heater, two auxiliary condensers with pumps, and all the most modern appliances to economize fuel and labor.

Steam for the main engines is generated in 12 large double-ended boilers, each having eight corrugated furnaces. The boilers are arranged in two groups of six, each group self-contained in water-tight compartments, and having a common funnel of the unprecedented diameter of 21 ft. The two funnels are from their lowest section 120 ft. high. There is also a large single-ended boiler for supplying steam for the electric light, refrigerating, and other auxiliary machinery. In addition, a small single-ended boiler is fitted on the lower deck for supplying steam to the distilling condensers, heating pipes, etc. An elaborate system of piping is fitted throughout the ship and connected to the various auxiliary pumps for filling and emptying the ballast tanks, pumping out bilges, pumping water on deck in case of fire, and other purposes.

The greatest care and forethought have been expended on the structural arrangements. All scantlings have been especially arranged, and every advantage taken of the improved sections of steel, channel bars and Z-bars, etc., in order to increase the strength without adding unduly to the weight. The shell plating is in lengths of 26 ft. From the keel, which is of the flat plate type, up to load water-line the plates are fitted on the lap-butt principle, which is taking the place of flush end-to-end butt-strapped joints in merchant ships. The *raison d'être* of this change doubtless lay originally in the saving of weight and of riveting, but experience has shown that the overlapped joint, though less slightly than the flush butt, is stronger and more efficient. The method adopted is somewhat more elaborate and expensive than in ordinary practice, and follows closely upon the example set by Messrs. Harland and Wolff, of Belfast, in the City of Paris.

The shell plates are scarfed—thinned and tapered away at the ends—for the width of the seam, thus dispensing with the tapered packing pieces in the seams at the overlap. This forms a much fairer, easier made watertight, and more slightly seam, and presents a surface to the water offering less frictional resistance. The lapped butts are all quadruple-riveted. Above the water line the plates are fitted end to end in the usual way, and butt-strapped both inside and out. The landing edges of the shell plating in the region of the sheer strakes and at the bilges are treble-riveted.

Although fitted with twin screws, there is an aperture in the stern frame similar to that in a single-screw steamer so that the propellers may work freely, though they are fitted close to the centre line of the ship in order to prevent damage to or from the quay walls. No struts are fitted at the stern frame to support the outer end of the shafts, as in most other twin-screw steamers. The frames of the hull are bossed out and plated over right aft, so as to form the stern tubes. At the outer end of these, strong castings of steel, weighing about 20 tons, are fitted, extending completely across and through the structure. These serve the purpose of shaft brackets, and being in continuation of the lines of the hull are calculated to offer the least resistance to free propulsion. What in other vessels forms the upper part of the rudder is a fixed and symmetrical part of the hull structure, the rudder proper being entirely under water. It is of the single plate type, being formed of a heavy steel casting with massive arms, between which a thick plate is fitted and riveted. This plate, which has earned some notoriety as being "made in Germany," is in one piece, and weighs about 10 tons, the whole rudder weighing about 24 tons. The cast framework of the rudder, as indeed all the heavy castings entering into the ship's structure, were supplied by the Steel Company of Scotland, including the sternposts, which are of unusual form. Each complete sternpost weighs about 90 tons, and consists of

four pieces, riveted together; in position the main post reaches a height of about 50 ft.

The bottom of the vessel is constructed on the cellular principle for water ballast, with numerous watertight subdivisions. There are four complete tiers of beams, all plated over with steel and sheathed with wood planks, forming the upper, main, lower and orlop decks. The last is used for cargo and refrigerating chambers, storerooms, etc. The other decks are entirely devoted to the accommodation of passengers, with dining and social saloons, staterooms, bathrooms, lavatories, etc., all on a scale of unequaled magnificence. No expense is being spared on anything calculated to render traveling at sea more comfortable and enjoyable. The casings around the boiler-rooms are double, the intervening space being filled with a non-conductor of heat and sound. The ventilation throughout, both by natural and artificial means, is very thorough. The greater number of the sidelights are fitted with an arrangement for the free admission of air, even when, during rough weather, the lights are closed. A complete system of steam heating is fitted for the comfortable warming of all the living spaces.

The electric installation is by Messrs. Siemens Brothers. There are four sets of generating plant, each consisting of a Siemens dynamo, coupled direct to a Belliss engine, which runs at the rate of 280 revolutions a minute, and gives an output of 42,000 watts. This is capable of supplying 1,350 16-C. P. incandescent lights—including eight large reflectors of eight lights each, for working cargo—throughout the ship, and, in addition, a powerful searchlight for facilitating the navigation of the ship into port, the picking up of moorings, and scouting in time of war. The large switchboard for controlling the lights consists of thirteen sections, so arranged that each may be connected with any of the four dynamos. From these dynamos and this large switchboard, there runs throughout the ship upward of 40 miles of wiring.

The completion of the ships may be somewhat delayed by a strike of the carpenters and joiners.

Both hulls and engines are built by the Fairfield Co. (formerly John Elder), of Glasgow, the builders of the Arizona (the first of the modern style of Atlantic fast passenger steamers), the Alaska, Umbria and many other fine vessels.

Watson & Stillman's Portable Crank-Pin Press.

This tool, the most powerful, portable shop tool which we have any knowledge of, was designed for engine shop work, where there were a variety of services required. It is very complete, the large ram, giving a pressure of 250 tons, being operated by a double plunger pump; the low pressure piston drives it forward at four times the speed of the other, and will give a maximum pressure of 60 tons. A small cylinder for withdrawing the large ram is placed on top of the larger one, and the ram of this is connected to the larger one. A pair of geared screw valves throws the pump delivery to whichever cylinder it is desired. The whole tool can be raised or lowered by a wrench placed on either of the four elevating screws at the corners, or, if it is desired, the chain may be taken off and each screw operated independently. The beam and cylinder are made of steel and in one piece, in order to secure lightness. The rod centres are adjustable, from 23 in. to 38 in., the diameter of the attaching rods being assumed at 4 in. The centre of the large ram is adjustable vertically from 20 in. to 32 in. The shipping weight is about 2,600 lbs. This machine is manufactured by the Watson & Stillman Machinery Works of New York.

What We Read in the Newspapers.

Once in awhile a train accident gets reported in the *Railroad Gazette* worse than it actually happened; though, as may be judged from the infrequency of the corrections published—and we publish all we receive—our errors are generally in the opposite direction. But as indicating the kind of sifting that has to be done to get correct accounts, the reader may be interested in the following specimen:

PRESS ACCOUNT.

Racine, Wis., Jan. 29.—At 10 o'clock last night the first section of freight train No. 105 was side-tracked at Cudahy to let a northbound passenger train go by. Owing to a misplaced switch and dense fog the passenger train went crashing into the caboose, smashing it and derailling three or four other cars.

Eight persons were injured, two of them perhaps fatally. The injured were: McClinchy, freight conductor, skull crushed, will probably die; K. W. Chapman, fireman, hurt about the back and chest, may die; Louis McCue, engineer, cut about the head and body, not dangerously; Niles, brakeman, hurt about the head and body, and four unknown men. The injured were taken to Racine on a special and are at St. Mary's Hospital.

OFFICIAL ACCOUNT.

Between Cudahy and Bay View an empty engine ran into the rear of a freight train which was moving at about 15 miles an hour. No misplaced switch, no cars derailed. The number of persons injured was two.

The Bessemer Steel Production of 1892 and Previous Years.

The product of Bessemer steel ingots for each half of 1892 and the total output for 1891, with the product of Clapp-Griffiths converters, is given by Mr. Swank as below, all in gross tons.

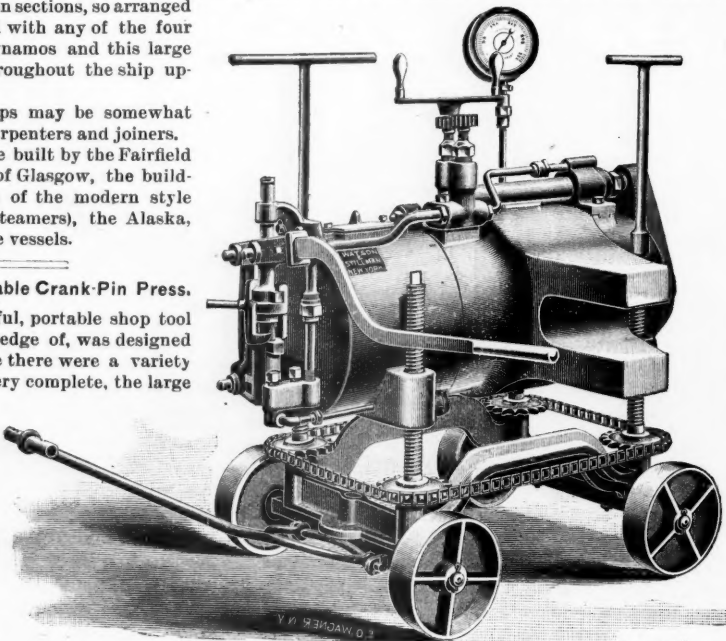
States—ingots.	First half 1892.	Second half 1892.	Total 1892.	Total 1891.
Pennsylvania.....	1,218,504	1,169,508	2,388,012	2,048,330
Illinois.....	437,067	443,167	880,234	605,921
Ohio.....	210,946	211,036	421,982	333,665
Other States.....	202,411	278,535	480,946	259,500
Total.....	2,068,928	2,102,044	4,160,972	3,247,417

Clapp-Griffiths only..... 36,974 30,552 67,526 65,389

Excepting a comparatively small quantity rolled from purchased blooms, the Bessemer steel rails of all weights rolled in this country were, by the same authority:

States—rails.	First half 1892.	Second half 1892.	Total 1892.	Total 1891.
Gross tons.				
Pennsylvania.....	474,018	411,634	885,652	849,556
Illinois.....	240,925	209,628	450,553	364,725
Other States.....	57,493	65,045	122,538	25,112
Total.....	772,436	686,307	1,458,743	1,239,393

Bessemer steel rails were first made here, commercially, in 1867, when 2,277 gross tons were rolled. The production of rails has fluctuated since, reaching its maximum in 1887; and the production of Bessemer steel ingots, which at first were made almost entirely to supply the demand for rails, reached its maximum last year, when only about 35 per cent. of the product went into rails. Bessemer steel is of course largely used in construction work, its relative cheapness as compared with open hearth steel leading to its employment in many cases where open hearth steel could be used to advantage.



Watson & Stillman's Portable Crank-Pin Press.

age and is used in countries where greater demand has cheapened its production.

The total production of Bessemer steel ingots in this country and of steel rails, with the percentage of the total ingots which went into rails, the average price per ton, in currency, and the net additions to our railroad mileage each year are given below:

	Gross Tons—Ingots.	Rails.	Percentage in rails.	Average price of rails.	Net addition to railroad mileage.
1867	6,451	2,277	35.00	\$166.00	2,249
1868	6,516	7,589	85.00	153.50	2,979
1869	33,337	10,712	80.43	132.25	4,615
1870	34,152	37,482	89.94	106.75	6,678
1871	107,239	40,178	85.00	102.50	7,379
1872	152,368	83,991	78.00	112.00	5,873
1873	171,368	115,192	75.60	120.50	4,097
1874	171,368	129,414	75.52	94.25	2,117
1875	335,283	259,699	77.45	68.75	1,711
1876	469,639	368,269	78.42	59.25	2,712
1877	500,489	385,865	77.10	45.50	2,280
1878	553,773	491,427	75.30	42.25	2,679
1879	629,440	610,682	73.65	48.25	4,817
1880	1,074,261	852,196	79.32	67.50	6,712
1881	1,374,250	1,178,770	86.43	61.13	9,847
1882	1,514,688	1,284,067	84.77	48.50	11,469
1883	1,477,345	1,148,709	77.75	37.75	6,743
1884	1,375,532	999,983	72.48	30.75	3,924
1885	1,519,430	959,471	63.15	28.50	2,982
1886	2,269,190	1,562,410	68.85	31.50	8,018
1887	2,936,033	2,049,638	69.81	37.12	12,878
1888	2,511,161	1,365,921	54.39	29.88	6,912
1889	2,930,204	1,470,267	50.17	29.25	5,184
1890	3,688,871	1,871,425	50.73	31.75	5,349
1891	3,247,417	1,239,393	38.16	29.92	3,899
1892	4,160,972	1,458,743	35.06	30.00	4,150

The production of iron rails for 1867 was 410,311 gross tons at an average value of \$83.13 for the year. The largest make in this country was 808,866 tons in 1872, valued at \$85.13 for the year; 1882, when the make was 203,434 tons, valued at \$45.50 per ton, was the last year in which iron rails competed with steel for railroad uses, the production after that date having been for street

railroads and special purposes. The production of steel rails exceeded that of iron rails in 1877, when the production of iron rails fell to 288,294 tons, and though in 1880 the output rose to 440,859 tons, iron rails were losing proportionally all the time.

There is at present an anomaly in the prices at which steel is sold. In England, according to the reports in the last issue of the *American Manufacturer*, steel billets, blooms and rails are quoted at £4, or \$17.92, and the same paper quotes the Pittsburgh market for billets and blooms at \$21.25@21.50, and steel rails at \$29. Steel rails in England are rather low as compared with billets, while here they are unnaturally high compared with the same standard. This relatively high rate for rails is undoubtedly due to a combination which has so far held up their price as, probably, to restrict the consumption. It is a noteworthy fact, which we do not endeavor to explain, that during the end of 1889 and the first of 1890, while the provisions of the McKinley bill were under discussion, the prices of steel rails in this country and in Great Britain were fluctuating about a common level, the price for one week having been quoted higher there than here, but since the adoption of the reduced duty from \$17 to \$13.44 per ton, there has been a material fall in England, while for 1891 and 1892 the price here has been higher than in 1888 and 1889.

Foreign Railroad Notes.

Dining cars are to be introduced on several Russian routes this year.

The passenger fares on the Austrian State Railroads were advanced slightly Nov. 1, and a stamp tax of a kreutzer (half cent) per ticket went in force then.

At the close of 1891 there were 11,218,000 basket willows planted along the Austrian railroads, an average of 1,156 per mile of road. The value of the willows cut is given as \$5,650, but only about one-third of them were sold, the rest being used by the railroads themselves.

Russia has followed Germany in increasing the capacity of freight cars. The standard has been 600 poods (21,600 lbs.), but now the regulations speak of 700 and 750-pood cars (25,200 and 27,000 lbs.)—all on four wheels, be it remembered.

In Russia, during 1891 (recently reported), the additions to the railroads amounted to 82 miles only, but 822 miles of second track were built. At the close of the year the total open for traffic was 18,240 miles, of which 3,770 miles were double-track road, and 6,851 were in the possession of the state. The government acquired 1,313 miles during 1891.

During the last five years the Prussian State Railroads have built a great number of dwelling houses for their employes, and they have now no less than 22,980 such dwellings, of which 458 are for officials of a higher class, 6,500 for employes such as station foremen and assistants and roadmasters, and more than 16,000 for the lower grades of employes, and especially switchmen and trackwalkers.

The casualties by rail in France in 1891 have recently been reported as follows:

	Passengers.		Employers.		Others.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
By train accidents.....	54	431	8	91	—	19
By other accidents—						
Through carelessness.....	45	99	211	447	150	95
Otherwise.....	2	11	29	238	12	32

This is a total of 62 persons killed and 541 injured by train accidents, 438 persons killed and 922 injured by other accidents.

After the bad harvest of 1891, the Russian railroads as a whole showed an increased traffic, compared with the previous year, for many months, the movement of supplies to the suffering districts apparently exceeding the shipments from them in average years. But the close of the crop year shows a material change. In August (only recently reported) the number of passengers was 7 per cent. less, the tons of freight were 12½ per cent., and the earnings 17 per cent. less in 1892 than in 1891. For the first seven months of the year the freight traffic and the total earnings were greater in 1892 than in 1891.

A statement has been made of the supplies shipped into the districts suffering from famine last year under the special tariffs and regulations made by the Russian government, which were in force from June 26, 1891, to Sept. 5, 1892. The total shipments were 2,193,124 tons, of which 178,260 tons were carried free, 1,302,514 tons at five-sixths cent per ton per mile (0.01 kopek per pood per verst), 394,817 tons at a reduction of 52 per cent. from the regular rates, and a small quantity at a reduction of 30 per cent. About one fourth of the whole was shipped on a single railroad, the one which reaches the Caucasus from the north.

The Hungarian government proposes to deepen the Danube ship canal at the Iron Gates one metre, and establish a great transfer station at Orsova, which will be made, as it were, the eastern port of the kingdom.

The purpose is to have large steamers ply between Orsova and the Black Sea, and to depend on the Hungarian railroad system, rather than on the steamboats above Orsova, for transportation further west. Unfortunately the Danube runs the wrong way. By far the larger part of Hungarian produce is further from market at the mouth of the Danube than where it was produced. Nevertheless, a cheap route to Roumania, Bulgaria and the Black Sea is not without value, and Hungary is developing industries which may find a considerable outlet in the East, and the deepening of the canal is estimated to cost but \$750,000.

The reduction in Berlin suburban fares, of which we gave an account some months ago, seems to have resulted satisfactorily. During the three months ending with June, the number of passengers was 9,576,301 in 1892, against 7,153,865 in 1891; and the earnings from this traffic were 2,189,994 marks, against 2,026,780, an increase of 34 per cent. in passengers, and of 8 per cent. in earnings. The average fare paid per passenger was about 5½ cents last year, against 6.8 in 1891. The distances are all short. No change was made in the price of time commutation tickets (monthly, etc.), and there was a decrease of nearly one-fourth in the sales of these, and there was also a decrease in workmen's tickets, but allowing for these there remains an increase of about 5 per cent. in suburban receipts.

A striking example of the worthlessness of statements of numbers of tons shipped as a measure of freight traffic is shown by the use recently made of the figures for the German railroads. One of the numerous "statisticians" who measure transportation by tons recently compared the growth of Russian with that of German freight business. By this it appeared that while 168 millions of tons were shipped in Germany in 1882, five years later the quantity was only 149 million tons, though business had grown greatly during that period. But in the old days, what is now the Prussian State railroad system consisted of more than twenty different railroads, and it was very common for a single shipment to pass over four or five roads, in which case it was counted and reported by all of them. When the state system was first formed, every "directory," with 2,000 miles or so of the system, reported its shipments independently, and many passed over lines of two or three or more directories. For several years, however, the state system reports as a whole, and a ton counts but once, whatever number of lines of the system it may pass over. A comparison of the true measure of transportation—the ton-miles—tells a different story, and tells the truth. Instead of a decrease in freight traffic of 12 per cent. from 1882 to 1886, there was an increase of 16 per cent., and the movement in millions of ton-miles in Germany has been:

1881-82.	1885-86.	1890-91.
13,751	15,965	22,237

The true increase in the last ten years was thus 63 per cent., while the reported number of tons increased only 28 per cent.

The *Journal* of the German Railroad Union in its last issue of 1892 reviews the year, and finds it an exceedingly unfavorable one. The years, it says, fortunately are rare when the nations suffer under such a general depression, and it prays to be spared other years like it. It complains, among other things, of the restriction of emigration to this country caused by our quarantine measures; and it is easy to see that such a restriction is a misfortune to Germany, coming just at a time when bad business has made it more than usually difficult for the growing population to find employment there. It says that German manufacturers would probably feel strongly inclined not to exhibit at Chicago, but for the necessity they may feel to defend their Asiatic and South American trade. The present dullness of trade, it says, is all the more serious because it is not the result of serious overproduction. The *Journal* seems to think that the bad condition of things which it describes is universal. Here in America, however, we are very well, thank you. A review of the situation in Austria-Hungary in the same journal paints it in very dark colors also. The cholera in Hamburg seems to have affected traffic there almost as much as in Germany. The most important events in the railroad history of Germany in 1892 are said to be a law providing for cheap local railroads in Prussia, which will emancipate them from many severe requirements of the old general railroad law, and the introduction of "standard time" on the railroads, which a bill now pending in the Diet will doubtless extend to all other business.

Asphalt in Engineering Construction.

The use of asphalt in engineering work, for foundations for machinery, street paving, embankments, etc., has attracted more and more attention during the past few years, and very satisfactory results have been obtained with it. An article in *Les Annales des Travaux Publics* of Jan. 15, is, therefore, of interest, detailing, as it does, some of the various applications which have been made of the material and giving corresponding illustrations. The subject is treated of under two heads; first, the use of asphalt concrete, and, second, the use of asphalt in its natural state. Under the first head examples are given of sidewalk and floor construction,

bridge arches, dock walls, steam hammer and engine foundations, while under the second head sections of roadways paved with compressed asphalt are given, together with other examples similar to some of those previously enumerated, such as machinery foundations. For the latter, asphalt has proved of special value because of its tendency to prevent vibrations, and cases are on record where annoyance from jar from trip hammers, and heavy, high speed machinery was successfully overcome by using asphalt in the substructures. For street paving the use of asphalt is too well known to require special mention.

Where the asphalt is to be employed for machinery foundations it should be borne in mind that contact of heated bodies, such as, for example, steam engine cylinders, with the asphaltic surface should be avoided since heat will soften the asphalt. The adoption of an intervening layer of some non-conducting material is, therefore, recommended in certain cases. Cement will answer the purpose. A steam cylinder may be isolated by a layer of brick laid in cement. The second thing to be guarded against is the contact of lubricants, mineral oils above all others. The effect of such oils is to soften the surface exactly as when heated. Proper collecting pans should be used at all points where oil may drip.

THE SCRAP HEAP.

Notes.

John Sume, 19 years old, has been sentenced to 10 years' imprisonment at Kingston, Ont., for placing an obstruction on the track of the Grand Trunk road last March.

George June, the operator at "H. B." block signal tower on the Pennsylvania road, who gave the clear signal which led to the recent collision, has been arrested on a charge of manslaughter and sent to prison in default of \$10,000 bonds.

Dr. F. L. Flanders, a well-known citizen of Kansas City, has been arrested for fraudulent use of the mails. It is said that he represented himself as the President of the "Kansas & Missouri Transportation Company," and sent out passes, asking for passes for himself in return.

A concern in Cincinnati is advertising a coupon ticket designed to facilitate the restriction of the passenger's trip to a continuous passage. On the back of each coupon is printed a series of numbers to show the date and time of arrival of the passenger at the point where he changes from one road to another, these figures being duplicated on the next coupon. The conductor holds the coupon reading over his line face to face with that reading over the next connecting line, and punches in the figures on the back the month, day of the month, hour and minute his train arrives at destination; this record thus appears on both his coupon and the next one.

Stealing on the Atchison, Topeka & Santa Fe.

Over ten years ago the Atchison, Topeka & Santa Fe lost thousands of dollars by a clever conspiracy between station agents and passenger conductors along the line of the road in Colorado and New Mexico through the fraudulent use of tickets. Agents would either issue a bogus ticket or would sell the regular tickets unstamped, and these the conductors would return unpunched to the office of issue, the conspirators sharing in the proceeds. Last month detectives unearthed a still more bold and daring conspiracy, and many arrests have been made. In this conspiracy freight crews, station agents, and ex-employees have worked together to systematically plunder freight in transit, and the losses are variously estimated from \$70,000 to \$150,000.

For nearly two years complaints from merchants along the line of the road in Colorado and New Mexico and from shippers of transcontinental freight have been filed with the company of losses of goods in transit. No one in New Mexico could get goods from the East without toll being exacted. One Las Vegas merchant had to order seven cases of goods before he received one. The complaint was general. The entire detective force of the company, assisted by outside experts, went to work to ferret out the guilty parties. Each division of the road was carefully watched, beginning from Chicago, and for weeks the freight was all checked over at division points. In this way they finally discovered that the plundering was done between La Junta, Col., and Albuquerque, N. M. The detectives then set to work to gather evidence against the men implicated. Before their plans were ripe, the first arrests were hastened by a quarrel between two of the conspirators. A brakeman named Agarter, in La Junta, caused the arrest of a freight conductor named Crotty for stealing a trunk. Agarter refused to prosecute the case, and then the detectives decided to cause the arrest of both of the men in order to get that trunk, in which some of the stolen goods were afterward found. Then at La Junta, Trinidad, Raton and Las Vegas arrests were made as fast as the train men came in on their runs. A number of trainmen left their posts before the trains reached division points, and the engineers had to come in without conductor or brakemen.

An agent and his wife at Thatcher station were arrested, and a search of the premises revealed the presence of much plunder. A liveryman in Raton fled, but was captured in Nebraska. He made a full confession, implicating many. Several conductors not suspected disappeared. A wagon load of goods was found in the house of an ex-employee. A saloon-keeper in Raton received the most of his stock of liquors and cigars from the robbers. Goods of all kinds were taken, costly silks and laces, carpets, rugs, stoves, furniture, silverware, musical instruments, liquors, cigars, sewing machines and a great variety of other things.

The method of robbery was simple, once the conspiracy having been well planned. The trains were stopped out on the plains, or at stations where confederates were located, the seals were broken and the goods taken out.

The cars were re-sealed so as to defy detection. It is believed that when a new seal was placed on the car the old seal was hammered upon the new until a reverse impression was made. Those who examined the seal would pass it thinking it had been done in haste.

About fifty men have been arrested and several have made confessions.

Railroading Where the Mercury Freezes.

Drawn by a double-header, thirty-one hours late, covered with snow and showing signs of a prolonged struggle with innumerable snow banks, the Atlantic express, crunching and snorting, drew into the Canadian Pacific depot last night at 17:30. Ask a passenger about the state of the weather, and he immediately pulled his face into an expression of agony, and dilated upon the indications of the thermometer which showed all the way from 45 to 55 deg. below zero from Calgary to Brandon. The train left Vancouver on time. The weather was sharp and the ponds frozen over. The cold was severe at Calgary, registering 50 deg. below zero, but the train left only 20 minutes late. Then the drawbacks commenced; a severe blizzard was encountered all the way along and the train had countless lay-outs for slight repairs. Snow drifts five feet high covered the track at every few miles; but the trainmen undaunted persevered and brought the passengers to their destination safe and sound. The dining car Kensington met the hungry passengers at Moose Jaw and was heartily welcomed; it continued with the train to the city. . . . The temperature was the coldest many of the oldest settlers ever experienced.—*Manitoba Free Press* (Winnipeg), Feb. 2.

Galvanized Iron for China.

Galvanized sheet iron is coming into favor as a roofing material in Peking, the use of the metal for that purpose having hitherto been confined to the provinces. The sheets meeting with most acceptance are generally 2.14 metres long, 0.15 metre wide, and 1 millimetre thick, the weight being about 4½ kilogrammes or 14.3 lbs., and the retail sale price at Tientsin about one tael per sheet. Galvanized plates will be used for covering the large iron railway station which is to be built during the coming summer in Tientsin. The Chinese Government, being desirous of reducing expenses as much as possible, will, it is stated, other things being equal, give the preference to the lowest tender irrespective of origin. Intending competitors can obtain all particulars of the contract from Messrs. R. M. Brown & Co., of Tientsin.—*Iron*.

The Yardmen's Strike at Muncie.

This strike, heretofore noticed in these columns, seems to have been a hard-fought contest. A report in the *Chicago Inter-Ocean* of Feb. 1 gives the following particulars of the settlement: The Lake Erie & Western switchmen's strike at Muncie, Ind., was officially declared off to-day. Two weeks ago Samuel Ellis, a member of the Trades Council, was given power to adjust the differences with the company in any manner he saw fit. After several consultations with General Superintendent Hill yesterday an agreement was made. To day Assistant General Superintendent Jarvis came to Muncie and furnished the non-union switchmen, who have been working for 10 days past, with transportation home to Chicago. Muncie switchmen took their places, among them three of the strikers. The men receive an advance of 10 per cent. or a little over half the amount demanded, making wages \$2.15, \$2.25 and \$2.35. The strike has cost the company many thousands of dollars. Five of the strikers are serving jail sentences for contempt of the United States restraining order. Muncie Trades Council, representing the several labor unions, claim the victory for the switchmen. The non-union switchmen were compelled to work only in daylight and with an officer guarding them. The company also had to board the men at a hotel.

Another report says that three men were bound in \$200 to keep the peace for 12 months and 9 others were fined from \$10 to \$50 and given from 10 to 60 days in jail.

A press dispatch of Feb. 3 says:

The dozen switchmen from Chicago who filled the places of the strikers for a week were badly dealt with after leaving Muncie yesterday, and all are now in jail at Michigan city. At Peru a large crowd of Lake Erie railroad men attacked the train and a fight ensued, in which several persons were injured. The "scabs" continued Chicagoward until their arrival at Michigan city, where several Michigan Central switchmen joined the Lake Erie switchmen, and the "scabs" were again badly dealt with and all were jailed. The men would have been killed while at Muncie had they not been closely protected by officers.

From a Paper that Congressmen Read.

The arguments for the repeal of the prohibition of pools are strong, but not strong enough to overcome the popular conviction that their practical effect is to increase the cost of transportation. It could hardly have escaped attention that the report that the great trunk lines would not give excursion rates to the Columbian Exposition was almost simultaneous with the report that a systematic effort would be made to secure a repeal of the anti-pool clause of the interstate commerce act. One served as a warning against the other. The great railroad magnates may know how to run their regular business well, but when it comes to feeling the popular pulse and getting into line with the people their greatness is in bungling.—*Chicago Inter-Ocean*.

Aluminum.

A proposed application of aluminum, according to a foreign exchange, is found in the manufacture of slate pencils, aluminum pencils, it is stated, giving a clear and distinct mark on slate. Their inventor, it is said to be making them of a diameter of one-fifth inch, and claims that they will practically last forever, not wearing off appreciably, and, of course, being secure against ordinary breakage. The marks made by the pencils can, it is said, be rubbed out just like common slate marks.

A Norwegian prepares a new kind of solder for aluminum by mixing cadmium, zinc and tin in the following proportions: Cadmium, 50 parts; zinc, 20 parts, and tin, 30 parts. The zinc is first melted in a crucible, the cadmium is then added, and the tin is put in last. The mass is well heated and stirred to secure an intimate mixture, and is then allowed to cool. The solder so produced is said to be applicable for soldering several different metals, but to be specially useful with aluminum.

Kanawha River Improvement.

The contracts for building Lock No. 9 of the great Kanawha River improvement will be let by the Government Engineer on Feb. 16. The contract for No. 10 will be let Feb. 23 and for No. 11 on March 2.



ESTABLISHED IN APRIL, 1856.
Published Every Friday.
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Arthur T. Woods, associate editor of the *Railroad Gazette*, died at Chicago, Feb. 7, of typhoid fever. Mr. Woods was 34 years old; he was a member of the Loyal Legion, the American Society of Mechanical Engineers, and various other dignified and important societies, and had recently been appointed to a lectureship in the University of Chicago. He entered the United States Naval Academy, from Massachusetts, as Cadet Engineer, in 1876, and was graduated in 1882. He resigned from the Navy July 11, 1887, with the rank of Assistant Engineer, and his most important work has been in civil life. He was Professor of Mechanical Engineering at the University of Illinois, and later Professor of Dynamic Engineering at Washington University. He resigned the latter appointment last August to join the editorial staff of this journal. He had already become known as a strong, clear and well-informed writer on mechanical subjects, especially on steam engineering; and had he lived a few years longer his undoubted talents, his industry and his real love for scientific truth would have made him widely known and honored in the career to which he had finally decided to devote his powers. To us his death is not only the loss of a valued and respected colleague; it is a personal loss. For Mr. Woods was something more than a man of ability, highly educated and scholarly in his tastes; he was a man of high character, of great refinement and always a gentleman.

The newspapers have lately published two instances of the difficulties that a railroad traffic manager encounters when he endeavors to do close figuring in his efforts to grant the demands of the public. At Oakland, Cal., where large numbers of passengers take the Southern Pacific ferryboats every day for San Francisco, it has been found that the season tickets, which are issued as non-transferable, are bought by speculators and by them lent to persons who use them for transient trips. The price of these tickets is \$3 a month, while one round-trip ticket costs 25 cents. The passengers entering the boats come in such crowds that it is impossible for the gatemen to carefully scrutinize each ticket and identify the person presenting it, so that practically the non-transferable provision of the ticket is completely nullified. The difference in price between a ride on one of these and one at the single ticket rate is so large that the speculators can do a considerable business with people who are known to them, and who, it seems, can be trusted to return the ticket after it has been used. The Staten Island Rapid Transit road, which runs some 20 miles of railroad on Staten Island and a five-mile ferry to New York City, issues 54-ride tickets at a number of stations at \$3 a month to persons whose income is not more than \$7 a week; and the traffic department has had to issue a warning that the tickets will be withdrawn from sale if the use of them by persons enjoying a larger salary is not stopped. It appears that the tickets are sold on condition that the employer of the buyer vouch for him,

and it is asserted that employers' signatures have been forged on applications. The regular commutation rate is \$4.25 a month. This last case, it will be observed, is a direct attempt to apply to passenger business the familiar principle of increasing traffic by charging only "what it will bear." This is a very excellent principle, but hard to use with passengers. The Boston & Albany and, we believe, other Boston roads changed their season tickets to 100-ride tickets several years ago and made them transferable, raising the prices slightly from the old season rates. The 50-ride family tickets of the New York Central, the Erie and other roads are practically transferable, as the limit is not lived up to; in fact, a limit specifying "family, servants and guests" is not much of a limit, anyway. Theoretically the Southern Pacific could have a collector examine the tickets, somewhat at leisure, on the boat, but probably that would produce more friction than the saving would be worth. We should think that the Staten Island road would do better to reduce the rates to all passengers on certain trains. To reduce prices simply because the purchaser is poor, without making any change in the quality of the thing sold, is an expedient which is pretty sure to make trouble, in whatever form it is tried. If the reduction increased the business and thereby made the profits large enough to warrant the employment of detectives to watch for frauds, the case might be different, but it takes a pretty large business of this kind to pay for efficient detectives.

Some of the New Railroads.

At the hearing before the Senate Committee on Interstate Commerce on the question of amending the Interstate Commerce Act, Mr. Ingalls, president of one of the Vanderbilt roads, said, "I do not know that another line between New York and Chicago would be an unmixed evil. There has not been a line started since the West Shore in 1883, and the business has doubled." When he was asked definitely if he thought there should be another road, he said, "Not exactly, but last year only 4,000 miles of railroad were built in this great country, and there should have been 10,000." In the further development of his idea, however, it seemed that the demand for more railroads, so far as it appealed to him, did not come from Chicago or New York, or any of the other great terminals and centres, but from the mines and forests of West Virginia. In other words, that it is a demand for railroads that will develop the resources of small areas, in old regions, and act as feeders to existing lines. At any rate, this is the sort of railroad building that has been done for some years and is still being done, and we need not enter into the question as to whether or not enough of it is going on every year. Fortunately, human enterprise is not governed by speculation of that sort, but in the end it is controlled by the sum of human needs and conditions, and it is not a very profitable task to tell people that they should or should not put more money into railroads. It will perhaps be of more real interest to make a slight review of the location and purpose of some of the more important additions made to the railroads of the United States in the year 1892.

In the list printed in the *Railroad Gazette* Jan. 13, there are about a dozen lines that built over 50 miles each of new railroad in 1892. First in length of new line comes the Great Northern, with 588 miles. This was at once the longest and the most important line of the year, and the only pioneer line. It makes a new line to the Pacific coast, of which there are now seven, and a few one was certainly not needed. Four lines now reach Pacific tide-water within a zone about 275 miles wide, measured north and south. But no one builds railroads now for the transcontinental business. In Washington the Great Northern has entered a great country, a country rich in its internal resources and which has already developed a considerable waterborne commerce along its extensive coast line. How soon the net earnings due to this Pacific extension will pay the increased fixed charges, it would be idle to predict, but the extension had to be made some time.

The new line next in length is the 200 and odd miles of the Missouri, Kansas & Texas (north and south ends taken together). These additions do not lie in territory which was in great need of railroads; but the railroad itself needed them badly. The fragments belonging to the Missouri, Kansas & Texas system were feeders to other roads instead of to its own main line, and its termini were at country crossings. By several short extensions, and by terminal arrangements with the Kansas City, Fort Scott & Memphis and the Chicago, Burlington & Quincy, the company enters Kansas City, will soon enter St. Louis, will soon reach tide water at Houston, and has brought all but one of its

outlying fragments into the system. A gap south of Dallas has been filled up, giving a continuous through line. The company owns the entire capital stock of the road from Houston to Galveston, but that is leased to the International & Great Northern, and now yields nothing to the M., K. & T. Probably some readjustment of the relations of these companies will soon be made and then the M., K. & T. will have through lines from Kansas City, Hannibal, St. Louis and Junction City to Galveston.

The Adirondack & St. Lawrence is the next in new mileage, 175 miles. This road is still something of a mystery. It has been built and equipped in a very expensive manner, with admirable roadbed, heavy rails, solid-floor bridges and heavy engines. It reaches a number of health and summer resorts whose business will probably fall far short of paying even the expenses of operation. The New York Central appears to have close relations with the road, and will try to make it profitable by sending New York City business to Montreal that way; but this business is not large and it had a more direct route before. But there is plenty of money behind the enterprise, and it is not likely to go into the hands of receivers or into the list of reckless rate-cutters, and the public can wait without uneasiness until its final purpose is revealed.

The Detroit & Chicago extension of the Wabash line forming a link in the loop between Chicago and Detroit makes up 153 miles out of the total built in 1892, and this with the Missouri, Kansas & Texas extension must be regarded as a legitimate new line, rather in the nature of an improvement of an existing line than as a new road. It gives the Wabash the shortest line between Detroit and Chicago. Its old line was 10 miles longer than the Michigan Central old line, and 23 miles longer than the Michigan Central Air Line division. It was 12 miles longer than the Lake Shore & Michigan Southern, and 23 miles shorter than the Chicago & Grand Trunk. It is now two miles shorter than the Michigan Central's Air Line. It is built also on very favorable grades, the maximum eastbound being 26 ft. per mile, and it is the same westbound, with but two exceptions. The saving in distance between the new line and the old line of the Wabash is 25 miles. Of course, these minor gains in distance saved do not warrant the building of 153 miles of new line, but the fact was that the Wabash had no line of its own between Detroit and Chicago before. It had trackage rights on the Chicago & Erie for 103 miles, for which it paid a gross rental of \$90,000 a year, plus a certain share in the station and maintenance of way expenses. It now gets an independent line, and with its good terminal in Detroit, in the Fort street Union Depot, it can compete with the Michigan Central for passenger traffic and with its shorter line and low grades can carry its Canadian Pacific traffic at considerably reduced expenses. The new line moreover passes through a rich farming country, which is sure to give it a local traffic of some value, although as there are no large towns on the route, this traffic will not be very important for some time to come. The line appears, moreover, to be so located as to introduce no serious new competitive elements into the traffic geography of that part of the country. A very careful examination of this project made by Mr. George S. Morison in 1891 led him to the conclusion that the assured increase of net revenue was enough to justify the construction of the new line.

The Norfolk & Western's Ohio River line had 115 miles of track laid on it in 1892. This is probably one of the most useful railroads built in 1892. It enables the Norfolk & Western to deliver north of the Ohio coal and coke from one of the best coal regions in the world, the Pocahontas field, and it can carry grain and other Western produce through to tidewater at Norfolk on favorable grades. Its tidewater coal trade was, of course, already established and is not affected by the new line. The new line is, we believe, excellently built, and the system is now in a situation to do a great coal and coke business and a reasonable through business between the Atlantic and the Ohio Valley.

Next in length is the Rock Island's line toward Texas, 102 miles. This road opens a hopeful field and gives the system connections with the principal cities in Texas and the Gulf coast. The Burlington line into Wyoming (102 miles in 1892) can hardly be called equally justifiable. The territory thus far opened furnishes little traffic but cattle; and the scheme to build through to the Pacific Coast—if the company really entertains the idea—is a bold and costly one, which will take years to accomplish at best. Meanwhile the line thus far built must live on scanty fodder.

The Minneapolis, St. Paul & Sault Ste. Marie has built 92 miles which may be regarded as a part of the

extensions of the Canadian Pacific system, established for the purpose of opening new wheat territory. The chief mission of the Sandusky & Columbus Short Line (97 miles) seems to be to carry coal from the Columbus, Shawnee & Hocking territory to Lake Erie. The Duluth, Mesaba & Northern, 72 miles, is to open rich iron mines. This last is undoubtedly legitimate, and the two preceding probably so; though the Ohio road, built to support the independence of the parent line, is a part of a movement which may easily be carried too far. The coal traffic there is in anything but a satisfactory state now, and each new railroad tends to make it worse.

We have gone through the list of the principal lines. The Lehigh Valley built, in 1892, 56 miles of its Buffalo extension. This 200 mile line would certainly be regarded as unnecessary if strict economy were to govern the commerce of the country, for the road had a trackage contract with the Erie which ought to have afforded a more profitable line for some years yet; and granting that the Erie had become unreasonable in its demands for compensation, an alternative was offered by a connection with the West Shore.

It may be said that these longer lines—aggregating less than 2,000 miles—do not indicate the needs of the country so well as the shorter lines which make up the larger half of our 4,000 miles. Quite likely this is true. The 120 miles laid by the Pennsylvania in short pieces in the coal regions, and the scores of other short lines built by old companies, doubtless indicate the character of the real needs of the country much better than any of the longer lines we have mentioned.

Service Strength of M. C. B. Couplers.

A prominent superintendent of motive power on one of the large Western roads has brought up an important point regarding the strength of the vertical plane coupler in actual service. By measurement of many cars in use he found the centre of the drawbar all the way from 30 in. to 36 in. above the top of the rail. If two vertical plane couplers are coupled together when there is only $2\frac{1}{2}$ in. difference in height, the bearing will be nearly all on one lug and but $\frac{1}{2}$ in. on the other lug. Taking into consideration the variation in the manufacture, and the round corners on the knuckles, this $\frac{1}{2}$ in. is not sufficient to make the strength of the lug on which this bearing takes place effective. Hence, with $2\frac{1}{2}$ in. difference in height, the bearing is practically all on one of the lugs of each of the knuckles. Cars cannot be kept so nearly of a uniform height as to bring them within the variation of $2\frac{1}{2}$ in., and it follows that as long as the link slot is used in the knuckle it will frequently occur that only one of the lugs of the knuckle will be so placed as to resist the pull or receive the blows. The very reasonable argument offered is that the strength of the coupler for practical service is not that offered by both lugs of the knuckle, as is commonly shown by laboratory tests; but is, in fact, only that of one of the lugs. As one of the lugs is but 3 in. deep, while the other is $3\frac{1}{2}$ in., the practical strength of the knuckles is limited to the strength of the 3-in. lug.

When two couplers of different heights are driven together with the knuckles closed, the $3\frac{1}{2}$ -in. lug will strike the 3-in. lug, and the limit of the strength of the coupler knuckles in buffing is found in the 3-in. lug. The argument is that the strength of the 3-in. lug is the limit of the safe basis of estimate of the service strength of the vertical plane coupler. It is, therefore, suggested that the standard tests of the M. C. B. Association be made to include single lug tests, and that tests be made in the immediate future to determine what is the resistance of single lugs in pulling and drop tests. It is also proposed to make the pulling test by hooking two couplers together with the centre lines displaced so that the bearing will be on but one lug. The results of these tests will be very interesting, and in some forms of couplers there will be found to be less strength than is generally supposed. The facts pointed out above may help to account for many of the breakages of one lug of knuckles which have not heretofore been satisfactorily accounted for.

The continued use of the vertical plane coupler has shown the need of more careful examinations and critical tests of couplers before putting them in service than were supposed to be necessary, and the proposition to adopt standard tests by the Master Car Builders' Association has now many advocates. Something more than a half dozen of the coupler manufacturers have put in drop test apparatus, and there is every prospect that the committee who have in hand the subject of tests of couplers, and who are now actively engaged in preparing their report, will be in possession of enough information to propose a plan for letter ballot at the annual meeting in June of this year. Such tests as have been made since the last convention

have brought out some very interesting facts. The one essential thing to know is settled; namely, there are couplers in the market that will stand the tests heretofore proposed, and there are enough of them to justify the position taken last year. But if the requirements are to remain the same for single lug tests as for double lug tests, it is probable that all the present coupler designs will have to be strengthened in the knuckles. The committee having this subject in hand had a meeting in Pittsburgh last week, and the plan for the report is well in hand. This report promises to be one of the most interesting of all that will be presented, and will probably provoke a lively discussion. The members of the committee are J. M. Wallis, J. S. Lentz, R. D. Wade, J. H. McConnell, G. W. Rhodes and T. S. Duncan. The appointment of Mr. Godfrey W. Rhodes on this committee was made recently.

English and American Passenger Cars.

An English correspondent contributes in this issue a description of the new cars that are to be run between London and Southampton, in connection with the new Inman service between the latter port and New York. While these cars may be, and no doubt are, great improvements upon the ordinary six-wheeled coach with a rigid wheel base of 18 ft., and even over, used generally on English roads, their moderate dimensions, 47 ft. 6 in. long by 8 ft. $\frac{1}{2}$ in. wide outside, and only 7 ft. $4\frac{1}{2}$ in. high inside at the centre, indicate plainly that they are many years behind our ordinary first class cars, not to mention parlor or drawing-room cars. The internal cubic contents of this car is under 2,500 cu. ft., while nearly double that amount is usual in American parlor cars with which this car should be compared, the highest rate of fare being charged for passage in both. Our so-called "first class" may be more fairly compared with an English "third-class," as in both cases the great majority of passengers travel in the cars running under these titles in their respective countries. An average of our first-class cars, with smoking-rooms on four-wheeled trucks, gives a cubic contents of nearly 4,000 ft.* The amount of cubic space in a car is an important factor in determining the amount of comfort the passengers will enjoy. The amount of floor space per passenger, 14.1 sq. ft., is ample, being little inferior to that usual in American parlor cars, but the cubic space per seat is 25 per cent. less.

The absence of ventilation in the roof implies a hot car in summer, the absence of heat (for tin water cans do not deserve the name) implies a cold car in winter, while the miserably insufficient width and height imply a cramped and stuffy car at all times unless the number of seats is limited, involving a long train in proportion to the passengers carried. All these disadvantages are moreover attended by a considerable dead weight considering the poor results attained. The weight per foot of cubic capacity is 19.5 lbs. against 15.7 lbs. for a far stronger American parlor car. A weight of 47,000 lbs. to accommodate 25 passengers gives a dead weight of 1,880 lbs. per passenger. This weight properly utilized as in any American parlor car would give six-wheeled instead of four-wheeled trucks and consequently far easier riding; fully 18 in. greater width and height inside; clear-story ventilation; communication from end to end of the train; a proper system of heating in cold weather, and many other advantages.

The side doors, of course, render it impossible to utilize the body as a truss and so weaken the car, while the absence of end doors and the consequent communication throughout the train are not only inconvenient to the passengers, but render it necessary to make a special stop to examine tickets, which, of course, cannot be done while the train is running.

The details, too, show many shortcomings. The smoking room, for instance, accommodates but four passengers out of twenty-five, a very insufficient proportion. It is moreover only separated from a main compartment by a single door, a provision which our carbuilders have long ago found inadequate to prevent the smell of smoke annoying ladies sitting in the body of the car. Two doors at some distance apart are absolutely necessary.

Some of the advantages of long cars can easily be demonstrated. Our correspondent states that it is proposed to run a train of these cars. A train of 10 such cars would seat in all 250 passengers, and weigh empty 470,000 lbs. If without altering the general design each car were made 61 ft. long, eight cars weighing in all about 430,000 lbs. would convey 264 passengers, a gain of 14 seats and a saving of 40,000 lbs. dead weight. The cost of four trucks complete, two sets of brakes, buffing and draw gear, six lavatories and saloons, and a large

part of the cost of two lighting plants would also be saved, while the cars would ride far more steadily.

The train would also cost somewhat less for maintenance and cleaning. The train would be about 8 ft. longer for the 14 additional passengers, or about 7 in. per additional passenger, while at present the length is about $24\frac{1}{2}$ in. per passenger. The weight per seat would be reduced from 1,880 lbs. to about 1,630 lbs. The secret of these advantages of long over short cars is that the earning length of the car, the body, can be increased with little if any increase in the non-earning length, the space between bodies, the lavatories, etc., while increased weight and cost of body need not be accompanied by any corresponding increase in the weight and cost of trucks, draw gear, brakes, lavatories, etc.

While any sign of advance in car construction on the other side is welcome it is to be hoped that some English carbuilders will visit us during the coming summer, and study the advantages obtained by the salient features of American cars. A long, wide, lofty car rides better and accommodates more passengers far more comfortably than a small car; and, given equal strength, is rather lighter per passenger. Passengers to the other side will, however, no doubt much appreciate stepping from the steamer into the train, and will, on returning home, have some feeling of shame when forced to pay \$5 for a rough ride in a ramshackle carriage with a slow horse over two miles of the filthy streets of New York.

Concerning the Morals of Brakemen.

The arrests of thieving conductors and brakemen which have been mentioned in our news columns lately indicate a neglect in some quarters of the precautions which employing officers should feel bound to observe for the protection of the corporations which they represent. If this discovery of criminals in railroad employ had been confined to Texas, it might perhaps have been argued, with seeming plausibility, that the opportunities for the selection of men are limited there, but this certainly cannot be said of the condition at Buffalo. Probably the trouble has arisen in both cases from a similar cause, and probably, too, from the accident that the hiring of brakemen had been entrusted to some one who had not yet learned from experience nor been impressed with, even if he had been taught by, precept the supreme importance of a good character as a qualification for admission into this class of railroad employes.

There are occasions where it seems necessary to relax the usual rigorous exclusion of doubtful persons, as in times of great pressure from unusually heavy traffic, when the question as to a man's morals appears of small moment in view of the positive need of an increase of forces for running trains; yet the bad men or doubtful who may have got into the ranks at such times are apt to be overlooked when the emergency has passed, and to stand on the same footing with the rest; and they may be depended upon to corrupt the weaker men who may be associated with them as certainly as one decayed apple will affect with rot all the other fruits which remain in contact with it.

It ought not to be forgotten for one instant, nor under any pressure of traffic, that this class or body of brakemen is the groundwork from which is built up the whole of the train service. Whatever kind of men is selected for that employment will extend its kind of influence permanently through all the other grades. If they are cowards and liars and dissolute, theirs are the qualities which will soon distinguish the baggage-men, conductors, firemen and enginemen, since all these classes are continually recruited from the ranks of the brakemen. If this class is corrupt at first, a gang of thieves may legitimately be expected at length, for every opportunity and temptation to theft lies in their way. In what other business than railroading would there be intrusted to a crew of five or six men, unsworn, unwatched, a train of 800 or more tons of valuable freight, in packages convenient for handling, to be transported through woods and mountain passes and other solitudes in the night, with a feeling of security that these valuables would all be delivered at the other end of the division? In thousands of instances this confidence is justified, and that it is so is a witness to the amazing power of discipline and a testimony to the care with which railroad officials have generally conducted the scrutiny of each man's record before he is admitted to the ranks; and their success in the exclusion of criminals or of such as are criminally inclined must be regarded as an impeachment of the discretion of others, who have hired gangs of thieves or have developed them.

The disposition among country youths to get into railroad employment is so universal that it may be taken advantage of in almost any part of the country,

* See page 977 of the issue of the *Railroad Gazette* of Dec. 30, 1892, for the dimensions and weights of passenger cars on various roads.

The reputations of such young fellows for honesty and sobriety or the contrary can easily be known, and those who have been steady and virtuous are an excellent stock to grow from; so too are the children of employes upon any road which is ten or fifteen years old, and they ought to be entitled to the first chance; it is rarely that they disappoint just expectations. The parents, having been subject to discipline, transmit more or less of it, by imitation, perhaps by inheritance, and obedience to orders has become in the family a tradition and a habit.

Of course, with the enormous development of business, the hiring of men has devolved to some extent upon the younger officers, who, with the best will, have perhaps not had sufficient experience of what is bad in the world to be quite enough on their guard against the dangers to which they may expose the service by the introduction into it of bad or inferior members. There is no topic upon which more advice is needed to junior officers than upon this one, so we have mounted to our pulpit for a moment to sermonize those who have evidently neglected a duty, hoping to reach also some who may have neglected it, but have not been discovered, before it is too late.

The Nicaragua Canal.

Since our last issue we have received the text of the amendments to the Nicaragua Canal bill introduced in the United States Senate by Senator Higgins. The provisions are, briefly, as we reported last week, that none of the bonds provided for in the Act shall be delivered to the Canal Company until the President of the United States is satisfied that the canal can be completed at a cost not to exceed the cash proceeds of the bonds for \$100,000,000; and he shall be satisfied also that this will provide for a canal and its accessories that will be "safe, convenient and economical for the navigation of mercantile and naval ships of the largest size now constructed, or likely to be constructed." In order to make certain that this result can be secured the amendments create a board of five engineers, to be selected by the President of the United States, three from the army and two from civil life, whose duty it shall be to visit the route of the canal and examine all available data, and report to the President. Sufficient reasons for such care before the Government embarks upon the enterprise of building a Nicaragua Canal were set forth in our issue of Jan. 13, but it may not be out of place to add some further arguments drawn from data which have recently been placed in our hands by a very high authority on the questions of navigation which are involved.

Comparing the Cape Horn route with the Nicaragua Canal route for sailing vessels, the Canal company estimates that for a sailing vessel of about 1,600 tons it will cost \$6,225 more to go around Cape Horn, but nothing is allowed for tolls through the canal. Toll is placed at \$2.50 a ton and it will cost at least \$1,000 to tow a sailing vessel of this tonnage through the canal, so that probably \$1,000, instead of \$6,000, would be the saving by going through the canal. But a very important nautical condition exists which would make the comparative cost still worse for the canal. The Pacific Ocean along the coast of Central America is within a calm belt. It is an ordinary thing for vessels to lie in ports along this coast for weeks before finding sufficient wind to take them to sea. The same condition exists in the Caribbean Sea, but perhaps not to quite so great an extent. But at Colon and also at Greytown sailing vessels are often detained a month waiting for a breeze. We may therefore conclude that it would often take as long, if not longer, for a sailing vessel to go through the canal as to go around Cape Horn, and the latter would be less expensive. There is no doubt that it would be necessary for powerful sea-going tow boats to cruise out to sea in the Caribbean and in the Pacific for a distance of 50 to 100 miles in order to pick up becalmed sailing vessels and bring them into the terminal of the canal; also to tow them out to this distance before they could find a breeze to take them on their voyage.

Another point of expense arises from the fact that there would be about one sailing vessel going west to ten going east, so that about nine-tenths of the trips through the canal by tow boats would be westward and without employment. The cost of coal, also, at Nicaragua will be very considerable, so that the average cost of towing large sailing ships would probably be considerably in excess of \$1,000 each. When it is known that the Nicaragua Canal Company is greatly depending on the sailing traffic, and that this traffic is largely bulky freights requiring very low rates in order to compete with other lines, it becomes a very serious question as to whether the canal can get much of the sailing commerce.

The Extension of the New Haven Road to Boston.

The Old Colony road is united with the New York, New Haven & Hartford, giving the latter a railroad under its own exclusive control from Woodlawn, and practically from New York, to Boston. Official action has not yet been taken, and the gossips say that the Boston & Maine, which, since it came under Reading's

influence, wants everything in New England and especially everything that can be used to injure the New York & New England, may possibly break up the bargain as it did the Connecticut River lease; but President Choate, of the Old Colony, says that the control of his road by the New Haven is practically assured. This outcome has been predicted for a long time and negotiations have been active for weeks, but no one divulged anything definite until Tuesday last. The terms are said to be as follows:

The New Haven leases the Old Colony at 7 per cent. for 99 years, from January 1, 1893; but a consolidation is provided for, nine shares of the New Haven stock, now receiving 10 per cent. dividend, to be exchanged for 10 shares of Old Colony, now a 7 per cent. security. The New Haven is to take possession July 1. No legislation would be required to lease the Old Colony, but the exchange of stock requires the consent of the Massachusetts Legislature. Old Colony stock has risen rapidly of late in the Boston market and sold on Tuesday at about 220. New Haven stock is selling at about 260. Mr. Choate seems to expect to realize about \$215 a share for Old Colony stock.

The chief motive of the New Haven road in acquiring the Old Colony is, of course, to get the leased Boston & Providence, only 44 miles long. To accomplish this it had practically to buy 600 miles of road and two steamboat lines. It is now not only freed from the fear that the Reading people will get the coveted 44 miles and join it with the New England, and thus strengthen the latter as a competitor for through passenger business, but is also independent of the Boston & Albany, which owns nearly half of the other Boston-New York line. It is already announced that a five-hour train will be run over the Shore line by July next. The New Haven officers say that under the arrangements hitherto existing, by which the New Haven, owning the larger part of both the through lines, was obliged, whenever the Shore line put on a new train or increased the speed of an old one, to let the Boston & Albany do likewise, the train service has been enlarged almost to the limit of profitability, and they intimate that this waste will be stopped. This seems to leave the Boston & Albany out in the cold. Whether that company is satisfied to do nothing but Albany business, or is preparing to sell out to the New Haven road remains to be seen.

The Old Colony road is a valuable property. The company owns or controls every railroad in southeastern Massachusetts (except on the two islands) and also lines to Lowell and Fitchburg. The funded debt by the last report was \$11,957,400, but bills payable on Oct. 1 last amounted to \$1,400,000, and the stock, \$12,567,000, has been increased by recent sales of \$400,000 new stock, which, sold at auction, brought in about \$800,000. Seven per cent. dividends have been paid for over ten years. The capitalization includes the road's ownership in the steamboat lines, the stock of the latter being treated as an asset.

What may be called the through business of the road is that between Boston and Fall River, connecting with the New York boats; between Boston and Providence, over the leased line; and between Boston and the seashore resorts in the summer. But the local business is large and profitable, though there are some lines with very light traffic. The freight earnings average 2½ cents per ton per mile, and they constitute three-fifths of the total earnings, which are about eight millions a year (\$14,000 per mile).

The New Haven road already had over 800 miles of road, so that the combination will be by far the strongest railroad in New England. The New Haven has power to increase its stock to 50½ millions; this purchase will require new stock sufficient to increase the total nearly up to this limit.

It is now high time that the New York, New Haven & Hartford get rid of its unwieldy name. The extension of the line to Boston affords a good occasion to adopt something shorter. To use a Connecticut name on Cape Cod is extremely absurd, unless the name be a good one. "Consolidated" doesn't mean anything in particular, and is a hard sounding word even if it did. "New York & Boston" savors too strongly of roads that never were built, or which failed. "The New Haven Road" sounds best, but we wonder whether Boston can stand it.

A butting collision of passenger trains on the Maine Central at Gardiner, Dec. 22, has been made the subject of a long report by the Maine Railroad Commissioners, and this report, published in a daily paper, is sent to us by a correspondent who says that "the collision was the talk of the state." It appears that it was not a serious one, but that the trains were both important passenger trains. The west bound is said to have been in charge of the oldest conductor on the road, and the east bound, consisting of 10 cars, in charge of the youngest passenger conductor. The east bound train being late, the west bound should have waited at the meeting point 15 minutes; the rule required the east bound to be at that point 10 minutes after the meeting time, thus allowing five minutes leeway. The collision occurred only a short distance from the meeting point, and the report indicates that the west bound started in a little less than 15 minutes, and that the east bound used a little more than 10 minutes. The testimony of the conductor of the east bound train indicates that, knowing he had hardly sufficient time to reach the meet-

ing point, he made his calculations in reference to a freight yard siding, a mile or so short of the meeting place; but his actual running seems to have disregarded this. In other words, he calculated that he could reach A at a certain minute, but after he once got started he threw aside his calculations and tried to reach B. Our correspondent wants our opinion. In the first place, the commissioners did a good thing in reporting the facts fully and clearly. It is not certain whether the full publication of the circumstances of all the collisions in the United States would be wise or not; there might be so many reports that they would not receive the attention they deserved; but it is undeniable that some of the best work of the British Board of Trade inspectors and some of their most valuable recommendations have been in connection with accidents which, like this, did not cause great personal injury or great loss of property. The next most obvious comment is that the five minutes' leeway seems to have been of doubtful value as a safeguard, if not a positively harmful provision. The careful and experienced men who, in formulating the standard code of train rules, made meeting points without any leeway whatever, find in cases like this a justification of their action. Safety in this matter depends upon the habits of caution of the men in charge of the trains and the constancy with which the superintendent follows up and punishes all stretching of the rules, and it is argued with great force that these elements can be maintained as well on a margin of one second as on one of 15 minutes. This matter of discipline would indeed have been the most pointed moral of the case, if it had happened six or eight years ago; but, in the language of the Massachusetts Railroad Commissioners, "the best conducted railroads are [now] rapidly abandoning" the time interval system and turning to the block system for protection against collisions, and that is the true lesson here.

The most important railroad legislation that has been proposed during the past week is the bill to establish a Railroad Commission in Indiana. The railroad committee of the lower house of the legislature of that state has unanimously agreed upon a bill providing for the appointment of three commissioners by the Governor. The Senate at Washington discussed the uniform freight car coupler bill on Tuesday, but took no action. Aside from these two items, the legislative news of the past week consists chiefly of variations on the previous reports of this year. In Alabama there is a bill to tax sleeping car companies doing business in the state. The Smaw bill to fix rates has been rejected. In Idaho there is a proposition to limit passenger fares to three cents a mile, which it is said the House Committee has decided upon favorably. In Illinois it is proposed to "regulate the sale of tickets and protect purchasers thereof." This is what the state has been trying to do for some years, but the scalpers of Chicago still flourish. There are also bills requiring passenger train bulletins at stations, and forbidding public officers to receive passes. Illinois also proposes, like Ohio, to make railroad companies responsible for fires near the railroad. The existence of a fire on land adjacent to a railroad is to be prima facie evidence that the road is responsible. The bill does not apply to buildings and other insurable property. In Minnesota, elevator and warehouse bills continue to multiply, and a bill to tax sleeping car companies has been prepared. Missouri proposes to place express companies under the supervision of the railroad commission, declaring them common carriers. A committee has reported favorably a bill giving employes a right to choose three of the five directors of hospitals in which they are interested. There is also a bill to prohibit railroad companies engaging in mining or other outside business. In New Jersey there is a proposition to regulate the employment of telegraph operators, which, among other things, excludes persons under 20 years old. Senator Hillier, of North Dakota, has introduced a bill proposing that the state build a grain elevator at Duluth, Minn. In Ohio, Senator Iden proposes to make railroads responsible for fines imposed upon engineers for violating the whistle laws, and in the house there is a bill giving members the right to ride free upon all railroads of the state. Railroad Commissioner Kirkby has prepared a bill to provide for the abolition of grade crossings. It seems to be modeled somewhat after the Massachusetts law, though differing from it in important details. It provides that the railroad shall pay not less than half the cost and the town or county not more than half. The Texas Legislature has been discussing a bill to require the use of automatic couplers on freight cars, and another to provide separate apartments at stations for white and colored passengers. West Virginia proposes to "place itself in the front rank of progress" by a law to prevent railroads from employing inexperienced conductors. A law of limiting passenger fares has been rejected in that state. In Wyoming a senator has moved to establish a railroad commission. There is only one railroad of any account in the state, but the senator says that one is oppressing the people.

On Feb. 3, the Pittsburgh, Fort Wayne & Chicago made the very unusual announcement that its line was practically blockaded, as far as freight was concerned all the way from Crestline to Chicago, 279 miles. A

press dispatch of Saturday stated that "at Crestline over 2,200 loaded cars await movement. At Lima, Van Wert, Fort Wayne, Plymouth and other points the situation is almost as bad. After Saturday all local freights will be stopped until further notice, and all the locomotives of the company will be put to work clearing up the blockade." Notices were issued at Pittsburgh that freight for points west of Crestline would be taken subject to delay. Newspaper items indicate that the stress was quite severe, amounting really to a total blockade for a short time, on various other parts of the Pennsylvania Lines West of Pittsburgh, though General Manager Wood announced on Monday of this week that the situation was "greatly improved." The cause of this remarkable situation is not very clearly explained. Shipments from Chicago eastward are heavy, though not remarkably so. Coal shipments to Chicago and beyond are pressing, on account of the continued cold weather in that region, but it would hardly seem that these two movements—being in opposite directions, and thus partly balancing each other—ought to completely clog traffic. One report says that engines from the Western lines are lent to the Pennsylvania lines east of Pittsburgh, where freight is also unusually heavy just now. Very likely this is the true explanation, though the stress of weather alone, extending over so large a territory and one unused to cold and snow, may make a very serious disturbance when freight is heavy. Extra engines on passenger trains, light loads for freight trains, and breakages due to weather will reduce the supply of motive power very fast. Several Chicago roads besides the Fort Wayne have refused some eastbound freight lately. The reporters claim that some roads do this, when they are not short of facilities, as a means of diverting freight for the purposes of the agreement among the competing lines, but positive evidence of this is not to be had.

A singular compound express locomotive has just been built for the Northern of France. The engine is of the eight wheeled type, four coupled drivers 7 ft. diameter, and a four-wheeled truck with 40 in. wheels. Two low pressure cylinders 20.9 in. diameter are placed inside the frames, and are connected to the main driving axle, which is cranked. The two high pressure cylinders are each 13.4 in. diameter, and are outside connected to the rear driving axle, the cylinders being placed between the rear truck wheels and the main drivers. This design involves four connecting rods, four sets of cross heads and slide bars and four sets of valve gear, while the inside gear is rendered more than usually difficult of access owing to the bracing between the high pressure cylinders surrounding the expansion links and connecting rods for the low pressure cylinders. The engine has no equalizers either for the driving or truck wheels. The truck is centre pin without lateral motion, the frame, springs and journals being outside. While the engine would no doubt ride steadily, as the high and low pressure cranks are diametrically opposite one another, the same end might have been attained by far simpler means. If the high pressure cylinders were placed close to the low pressure, one set of valve gear and one valve would serve for the two cylinders, while the long exposed exhaust pipe from the high to the low pressure cylinders would be dispensed with. It is, however, tolerably certain that the gain in steady running caused by placing the cranks opposite, and so balancing the disturbing effects of the reciprocating parts, is far less important as regards damage to the road-bed and engine than the unequal loading of the wheels, caused by the entire absence of equalizers. While, however, many French locomotive designers have endeavored to minimize the oscillations produced by the reciprocating parts, few appear to have considered the far more serious and destructive disturbances caused by running engines without equalizers over permanent way in anything short of perfect line and surface.

One of the features proposed for the celebration of the fiftieth anniversary of the Verein für Eisenbahnkunde, of Berlin, was, as may be remembered, a prize competition essay. In order to secure the best possible result in this undertaking, it has now been concluded to extend the time limit originally set for the competition, and it will not be closed until May 1, 1894. The subject originally set for the essay was a history of the Prussian railroad system. This, however, has since been considered as rather too comprehensive, and the competing essays, as now definitely settled, are to be simply contributions to the general subject. Any one of the several subjects connected with the history of the Prussian system may, therefore, be selected for treatment. The essays must be written in the German language and should be addressed to the Verein für Eisenbahnkunde, Wilhelmstrasse 92-93, Berlin, W. A sum of 2,000 marks has been appropriated for one or more prizes. The competition is open to all.

The newspapers have printed long dispatches from Chicago this week about a threatened strike of switchmen and other railroad employes, the statements being accompanied by the usual predictions of paralyzing traffic, etc., all over the country. The silliness of the story seems evident on its face, for the projectors of this gigantic combination, which is to tie up 25 railroads at

once, naively say that they have no affiliations with the older unions of railroad employes of various classes; but nevertheless the reporters have interviewed every railroad manager in Chicago and in New York. None of them know anything about the "movement." It seems to be a piece of bluster from the "United Order of Railway Employes," which has sent out circulars from its headquarters in Albuquerque or somewhere out there. Whether this "Order" has any members or not, no one knows. It is a grievous imposition on the community for the press associations to circulate this stuff.

It is well for our railroad companies to realize what the cholera may do for them if we let it get here and spread. In September last, when there was very little cholera in Germany, outside of Hamburg, the passenger earnings of the whole system of Prussian State Railroads were no less than 24 per cent. less than in the corresponding month of 1891. On the lines of the Altona Directory, which include Hamburg, the reduction was more than 50 per cent. One of the fastest trains in the Empire runs between Berlin and Hamburg. When the cholera first broke out this was well filled, going from Hamburg, but almost empty in the other direction; but a little later it had scarcely any passengers in either direction. Sept. 6, from Hamburg, it had none; Sept. 7, one; Sept. 8, two. Thereupon a large number of trains were taken off.

TRADE CATALOGUES.

Dixon's American Graphite Pencils.—This is the title of a handsome catalogue issued by the Joseph Dixon Crucible Company of Jersey City, N. J., makers of the well known Dixon's pencils and crayons, erasive rubbers, etc. The most that the ordinary critic can say of this catalogue is, that it shows 30 pages of lead pencils, illustrated by full-size drawings; but as the index of articles shows 100 different items, it is fair to say that purchasing agents and others interested in buying lead pencils may find the foregoing description somewhat inadequate. In point of fact, the information is so complete that one can, we should say, give an order for pencils intelligently with his eyes shut.

TECHNICAL.

Manufacturing and Business.

The firm of Taite & Carlton, dealers in railroad supplies, Victoria street, London, has been dissolved by mutual consent, and the business in the future will be carried on by Mr. John Charles Taite, under the old firm name of Taite & Carlton.

The Westinghouse Air Brake Works at Wilmerding, Pa., have been put on full time for the first time in 15 months. The plant has been running on half time for several months.

The Shultz Belting Co., of St. Louis, reports the following sales: To the Union Depot Railway Co., St. Louis, two belts, 54 in. wide, and to the St. Louis & Suburban Railway Co., St. Louis, one belt 72 in. wide and 154 ft. long. This latter belt is the third of this width and size which they have sent to this concern.

The Lansberg Brake Co., of St. Louis, Mo., has added three Lodge & Davis turret lathes to its manufacturing equipment recently, also a Lodge & Davis cock grinding machine. The shops are crowded with orders for freight car brakes.

The Madison Car Co., of Madison, Ill., has recently added eight overhead cranes to its wheel foundry. It has adopted the Whiting patent system, manufactured by the Detroit Foundry Equipment Co.

The Union Car Co. has been incorporated at Lancaster, N. Y., to manufacture cars. Capital, \$400,000, and Directors: J. J. Albright, Gen. George S. Field, E. Hayes, R. C. Board, J. A. Spoor and others. The shops will be erected near the those of the New York Central road at Depew, N. Y., and will include car wheel and casting foundries. It is said that the new plant, when started up, will have a capacity of 25 cars a day.

Iron and Steel.

J. C. Schulz, Master Mechanic at the Homestead Steel Works, has resigned. He goes to McKeesport to take charge of the new steel plant in that city. Harry Davis, Assistant Master Mechanic at the Homestead mills, has been promoted to Master Mechanic, to fill the place made vacant by the resignation of J. C. Schulz.

The Colorado Fuel & Iron Co. has orders for steel rails amounting to nearly 50,000 tons. The works at Bessemer, Col., are running double turn.

Tunneling the Simplon.

Work on the new Simplon tunnel has been commenced. When completed it will be the longest tunnel in the world. It will extend from Brieg, in Switzerland, to Isella in Italy, and its total length will be 12½ miles. It is expected that from eight to nine years will be occupied in the construction of the tunnel.

Multiple Dispatch Railroad.

In the *Railroad Gazette* of Sept. 11, 1891, were given illustrations of the roadway, cars and platforms of the Multiple Speed Railroad, a short section of which was built later, on the World's Fair grounds at Jackson Park and operated for several months. The experiments gave such satisfaction to the promoters as to warrant the building of a longer line on the lake front side of the grounds. Contracts have been let for the building of

the roadway and covering and also for the 10 motors and 355 cars or trucks that carry the platform, for a line to run from the Casino, at the shore end of the long pier, to the restaurant at the outer end of the pier. The total length of the road, measured on the centre line between rails, is 4,299 ft. The cars and platforms do not differ materially from those used on the experimental road. The speed of the platforms will be the same as before, viz. three miles an hour for the slower and six miles an hour for the second platform. The height of the top of the rail, that carries the trucks, above the floor of pier, is to be 2 ft. 10½ in. At each end of the pier there will be a loop of 64 ft. 9 in. radius. One tangent between these loops will be 1,668 ft. long. The others will be short tangents connected by curves of 80 ft. radius. On the three-quarter mile of road there will be 75 ticket offices, placed about 57 ft. apart.

While the construction of roadway and cars of the pier line will not differ generally from that of the experimental road, there will be one great point of difference that causes some apprehension. The continuous rails, which ride on the truck wheels and which carry the platform moving at six miles an hour, are of mild steel, 4×½ in., and this is bent alternately back and forth as the rails pass from the tangents to the curves, and vice versa. The bending and rebending to a curve of 64 ft. 9 in. radius may fatigue the steel, but this remains to be seen. It is intended to make these rails of 60-ft. lengths, welded electrically to one continuous rail.

Compressed Air Distribution in Chicago.

The ordinance granted by the Council of the city of Chicago permitting a corporation to lay pipes in the streets for distribution of power by compressed air is so indefinite that the public are afraid of it. The compressed air company does not signify its ultimate intentions, and it is this as much as the approach of the busy World's Fair season that has caused the Mayor to refuse to allow streets to be opened for putting in pipes. A compressed air franchise for the city of Chicago is too valuable and too important to be granted without a serious consideration by a board of engineers. It is unnecessary to say that the franchise already granted has received no such consideration, and what the promoters of the scheme intend to do is practically unknown.

Brooklyn Station of the East River Bridge.

The canvass of the three proposals for the new Brooklyn Station of the New York & Brooklyn Suspension Bridge over the East River, which were complete and in proper form, resulted as follows:

	Milliken Brothers.	Post & McCord.	Phoenix Bridge Co.
Total amount, exclusive of elevators.....	\$344,955.25	\$229,312.25	\$225,127.00

The contract for the work has been awarded to the Phoenix Bridge Co., the lowest proposers.

The Cape Cod Canal.

This scheme is once more being promoted, it is said, by New York, Boston and London capitalists who have petitioned the Massachusetts Legislature for a charter under the name of the Old Colony & Interior Canal Company. The New York people are represented by James L. Anthony, of No. 42 New street, and W. T. Bussey, of No. 5 Beekman street. The Boston men are represented by H. O. Mills and Warner Roosevelt; and it is said that Thomas Dobbins, of Brooklyn, will look after the interest of the foreign capitalists. The capital is to be \$7,500,000, and the estimated cost of building the canal is about \$15,000,000. The canal will connect Cape Cod Bay with Nantucket Sound, running from Sandwich on the north side to Cotuit Harbor on the south, a distance of seven miles. It is about 15 years since the first charter for this enterprise was granted.

The New Inman Liners.

The contracts for the construction of two swift steamers for the International Navigation Company were signed Feb. 7 by the William Cramp & Sons Company. The steamers will be faster than either the Paris or New York, and the work will be pushed as rapidly as possible in order that the vessels may be placed on the new Southampton route.

The American flag will be formally raised on the Inman steamers New York and Paris on Washington's Birthday, Feb. 22.

Mannesmann Locomotive Boiler Tubes.

According to the *Eisenbahn-Zeitung*, the Austro-German Mannesmann Tube Works have gone into the manufacture of locomotive boiler tubes by the Mannesmann process on a large scale with satisfactory results. At the beginning of last year the Royal Railroad Commissioners at Berlin began a series of careful tests of the physical properties of tubes for locomotive work and, on the strength of the results obtained, have not only concluded to henceforth fit up all their new locomotives with these tubes, but have also given heavy orders for Mannesmann tubes to be used for renewals. As a rather interesting and noteworthy novelty recently introduced in the manufacture of the tubes, the *Eisenbahn-Zeitung* cites the fact that, while the tubes are of uniform outside diameter, they are made with the inside diameters varying from end to end, giving a tapering interior, and a consequently greater thickness of the tube walls at one end than at the other. Advantage is to be taken of this feature by placing the tube

ends with the greater weight of metal, toward the fire-box end of the boiler, where there is apt to be most wear. At the smoke-box end, then, there would be less tube thickness which, it is argued, would be conducive to a better utilization of the available heat of the cooler products of combustion.

A Pike's Peak Hotel.

The Manitou & Pike's Peak Railroad has decided to build a substantial stone hotel on the summit of Pike's Peak large enough to accommodate 50 guests. There is plenty of stone on the mountain suitable for building purposes. The hotel will be kept open during the tourist season. The correspondent who sends this note adds that "The walls will be three feet thick, and the building will be made strong enough to resist the most violent storms that may sweep over the mountain."

LOCOMOTIVE BUILDING.

Three first-class freight and three passenger locomotives for the Pittsburgh & Lake Erie, May and June delivery, are now being built at the Pittsburgh Locomotive Works.

CAR BUILDING.

Murray, Douglass & Co., of Milton, Pa., will build 100 box cars of 60,000-lbs. capacity each, for the Lehigh & Hudson River Railroad to be used in the Central States Dispatch Freight Line. They will be delivered this month.

The Billmeyer & Small Car Company, of York, Pa., is reported to have an order for over 30 passenger cars from the Illinois Central. The firm has just shipped two passenger cars to Port Royal, Pa., for the Tuscarora Valley road.

The Pennsylvania has let orders for 1,000 freight cars for its Northwest system. Of this number the Indiana Car Company will build 200; the Missouri Car & Foundry Company 300; and the Madison and Barney & Smith car companies each 250.

As already announced the new car works at Basic City, Va., have been started up and are now working on an order for the Chesapeake & Ohio. The company operating the new plant is the American Car Co., with the following officers: President and General Manager, C. D. Pettis, Manager of the American Grain Door Co., of Chattanooga, Tenn., and late Superintendent of the Elliot Car Co., Gadsden, Ala.; Vice-President, W. W. Pettis, Auditor of the Elliot Car Co.; Treasurer, O. R. Goldman, of Gadsden, Ala.; Secretary, N. F. Pettis, of Lafayette, Ind.

BRIDGE BUILDING.

Albany, N. Y.—Among the bridge bills introduced in the New York Legislature last week were the following: by Senator Smith, appropriating \$5,000 for a bridge over Twitchell Creek on the Lake Champlain & Carthage road; by Senator Endres, appropriating \$20,500 for the removal and renewal of canal bridges at Canal, Prime, Scott and Perry streets in Buffalo.

Bellaire, O.—An arrangement has been entered into between the city of Bellaire and the Baltimore & Ohio Railroad whereby the railroad company is to erect a new steel bridge over the tracks in its yard at that point, at the Belmont street crossing. The bridge will be a plate girder with a span of 80 ft.

Boone County, W. Va.—A bill has been passed by the Legislature of West Virginia authorizing the County Court of Boone County to issue bonds for the construction of a steel highway bridge over Big Coal River at Paytonia. The County Court has had preliminary plans made for a steel bridge and estimates offered as to its cost. The bridge in contemplation will be of four spans, each about 60 ft. in length with steel viaduct approaches at each end. It is the intention to have the work done the coming summer.

Bullen Bridge Co.—This company, which has headquarters at Pueblo, Col., has been awarded the contract to build a county bridge to cost \$7,000. The same company is now building a bridge across the Willamette River, in Portland, Or., to cost \$280,000. The bridge is of steel with one fixed span of 300 ft., one of 240 ft., one draw span 380 ft., one 60 ft. span and 700 ft. of approaches.

Calgary, Alberta.—The town of Calgary is applying for power to build a bridge from the mainland to the Island Park in the Bow River, also a bridge connecting the islands in said park.

Duluth, Minn.—The Duluth City Council has passed an ordinance granting the Commercial Improvement Co., of New York, power to build a bridge between Rice's Point and Connor's Point, West Superior. There are now several bills before Congress relating to a bridge across St. Louis Bay at this point. It is probable that one of these measures will become a law, and that the bridge, when completed, will also be used by the electric railroads of Duluth and West Superior, making an interurban line similar to that now in operation between St. Paul and Minneapolis.

Harrisburg, Tex.—S. A. Oliver has the contract to erect an iron bridge across Bray's Bayou, on the present site, near Harrisburg, Harris County.

Harrison N. J.—The Pennsylvania has purchased land near the Passaic River, in Harrison, N. J., for the approaches to the new bridge for the New York Bay Railroad, which will connect with the main line west of the Meadow shops, near Jersey City.

Homestead, Pa.—The Senate bill to authorize the Homestead & Pittsburgh Bridge Co. to construct a bridge over the Monongahela River, from Pittsburgh to Homestead, was passed by the Senate this week.

Kanawha County, W. Va.—A bill has been passed by the legislature of West Virginia empowering the County Commissioners of Kanawha County to purchase the steel highway bridge now spanning the Great Kanawha River at that point and owned by the Charleston & South Side Bridge Co. if satisfactory terms can be reached, or to another bridge contiguous thereto in case of failure to purchase. The bridge is to be free of toll.

Kansas City, Mo.—A charter for the Kansas City Bridge Co. was filed in Missouri last week. The incorporators are P. H. Everhard, R. D. Swain, F. N. Chick, and others.

Little Rock, Ark.—Senator Berry, of Arkansas, last week introduced in the Senate a bill authorizing the Little Rock Bridge & Terminal Railway Co. to build a drawbridge over the Arkansas River near Little Rock.

Montgomery, Ala.—A bill has been introduced in the Alabama Legislature to incorporate the Montgomery Bridge Co.

Natchitoches, La.—Sealed bids, with plans and specifications for an iron drawbridge across Cain River, will be received until March 10 by C. V. Porter, President, Natchitoches, La.

Piedmont, W. Va.—The matter of building a steel highway bridge across the north branch of the Potomac River from Fairview street, Piedmont, W. Va., to Cromwell street, Luke, Md., is being agitated in those towns, and it is reported that the commissioners of the two counties interested are pledged to take early action looking to the construction of the bridge. The estimated cost of the bridge is \$15,000. The question will probably be voted on in March.

St. Albans, Vt.—The selectmen have awarded the contract for building an iron lattice bridge on Lake Street to the Vermont Construction Company of St. Albans.

Toronto, Ont.—The agreement between the Canadian Pacific and the town of Toronto relating to the proposed overhead bridge over the tracks of the railroad near its freight yard was signed last week, and the erection of the bridge will be commenced shortly.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

The Supreme Court of Nevada decides that since the act of Congress of July 10, 1886, providing that the surveyed but unpatented lands within the grant to the Central Pacific should not be exempt from state taxation by reason of the government lien thereon for the cost of surveying, etc., such lands have been subject to state taxation, but the conditions contained in that act, to the effect that the lien shall continue, and that the United States may become a preferred purchaser at any tax sale of such land, controls such sales.

In North Dakota the Supreme Court rules that the statute providing that "in lieu of any and all other taxes upon any railroad, . . . or upon the equipments, appurtenances or appendages thereof, or upon any other property situated in this territory belonging to the corporation owning or operating such railroad," there shall hereafter be paid a percentage of its gross earnings, does not exempt from taxation land belonging to a railroad corporation not embraced in any land grant and not used for railroad purposes.

In New York the Court of Appeals holds that, although the statute of 1884 authorizing the Supreme Court or county judge to order that a flagman be stationed or gates erected at the crossing of a street, highway, etc., by a railroad prescribes no penalty for disobedience of such order, an indictment may be maintained against a railroad company which is a common carrier for neglecting to comply therewith, under section 154 of the Penal Code, declaring every willful omission to perform a duty enjoined by law on any public officer or on "any person holding a public trust or employment," where no special provision is made for the punishment of such delinquency, as a misdemeanor.

An Iowa statute provides that a railroad whose road intersects or crosses any other line of the same gauge "shall" connect its road with such other railroad. A law of 1878 provides that the railroad commissioners shall have general supervision of all railroads in the state, and inquire into any neglect or violation of the laws of the state. A law passed by the 20th legislature provides that corporations having intersecting roads shall, "whenever ordered by the railroad commissioners," unite and connect their tracks. The Supreme Court rules that the action of the commissioners in a particular case is discretionary and not compulsory.

The Supreme Court of Connecticut rules that the successor of a railroad company to which land was conveyed by a deed providing that the top of the rails should be on a level with the ground is bound by the stipulations of the original conveyance and has no right to raise its track.

In New York, a strip of land forming the rear end of a city lot was appropriated by a railroad company, which laid its main track across the same. Later on, this track was used as a sidetrack for freight. Still later, the company raised the track by means of a trestle, and leased the strip for a coal yard. The company reserved the use and control of the strip, track and trestle for all railroad purposes, but the lessee devoted the property exclusively to his own use for the purpose of a trestle and coal yard, and by the construction of his buildings thereon denied access to the strip and railroad facilities connected therewith formerly enjoyed by the occupants of the lot and the public. The Supreme Court rules that such action constituted an abandonment of the strip for the purpose of a public railroad, and the owner of the lot was entitled to the possession of the strip as the owner in fee, freed from the easement of the railroad company.

In the Federal Court it is laid down that a city ordinance giving a railroad a right of way on condition that it allow other roads the use of its tracks within the city limits does not bind it to allow another road the use of tracks laid since the ordinance went into effect, beyond the right of way granted thereby, but is binding in respect to tracks on such right of way.

The Supreme Court of Georgia holds that, under the state statute providing that freight trains running "on Saturday night" may run through to destination, provided the time of arrival be not later than 8 o'clock on Sunday morning, a freight train not started on its schedule until 12:50 o'clock Sunday morning cannot be lawfully run either before or after 8 o'clock in the morning.

In Massachusetts the Supreme Court decides that under a traffic contract between two railroads, which places both roads under the management of a joint agent, and which provides for the payment of operating expenses out of the joint fund, and for the division of the net receipts in a specified proportion, one of the roads which, with the consent of the other, furnished a house for the use of an employee of the joint agent, may maintain an action to recover from the other its proportionate share of the reasonable value of the use of the house, where, by accident and mistake, such use was not included in the accounting between them.

In the Federal Court it is held that in California a mortgage of railroad rolling stock is a chattel mortgage, and is void as against a subsequent attachment, when not executed and recorded in the manner prescribed, or accompanied by the affidavits of good faith.

Injuries to Passengers, Employees and Strangers.

In Florida the Supreme Court holds that the claim of the railroad that plaintiff, who had been an express messenger, was attempting, when he was injured, to defraud the company by riding in the express car, and passing himself off as a messenger returning to his "run," was without merit where it appeared that on boarding the train he entered a passenger car, and had money with which to pay his fare, but that the conductor, although he knew these facts, did not request payment.

In Tennessee it is ruled by the Supreme Court that a railroad in coupling a freight train to a passenger car having passengers already in it, to be carried by the train, is bound to exercise extraordinary diligence—that is, such diligence as very prudent persons would use with a like train under like circumstances; and the court may instruct the jury that the rarity of an injury will furnish no excuse to the company for omitting that degree of diligence in the particular instance.

In Georgia a railroad conductor without apparent provocation rudely assaulted a passenger, used to him grossly opprobrious and insulting language, caught hold of him roughly, pulled him to the end of the car, threatened to kill him, appeared about to draw a pistol on him, and spit tobacco juice in his face. The Supreme Court rules that the company was liable for punitive damages, and was not entitled to prove in mitigation thereof that on a previous occasion the passenger had used slanderous and indecent language about the conductor's sister-in-law, and that this was the reason of the conductor's conduct, it being the first meeting between them since the alleged language of the passenger had been communicated to the conductor. The Supreme Court likewise affirms a rather caustic instruction given by the court below to the jury, to the effect that a "railroad is not released from its contract guaranteeing polite and courteous treatment to a passenger because the passenger does not smile upon the conductor, or because he wears a frown."

Another conductor of a kind rarely encountered, it is to be hoped, either in or out of Georgia, appears in another case in the state, where it is ruled by the Supreme Court that when a conductor on a passenger train stands by and winks while drunken and violent passengers insult, assault and beat another passenger, and force him to dance and sing, without using his power and authority to protect such passenger, a verdict for \$1,000 in favor of the latter is not excessive.

In Pennsylvania the Supreme Court rules that a passenger who alights from a moving car, after seeing one immediately in front of him fall in getting off, is guilty of contributory negligence, and the carrier is not liable for his injuries.

In the Federal Court of Appeals it is laid down that in an action against a railroad company for breach of contract for special train, damages cannot be recovered merely for disappointment and mental suffering resulting from delay in departing to reach the bedside of a sick parent.

In Indiana the Court of Appeals holds that when a conductor refuses to accept the return coupon of a ticket, thinking it not genuine, though it was perfect in letters, figures, and stamp, it having while in the passenger's possession lost its blue color, unknown to him, by being wet, the passenger can recover damages.

In the Federal Court of Appeals it appeared that at the city ticket office of a railroad company a passenger paid the price of a ticket from Detroit to Quebec and return, but by mistake of the agent was given a ticket, both parts of which were stamped for passage from Detroit to Quebec. He discovered the mistake when about to take the train and thereupon consulted a person temporarily in charge of the station office during the absence of the agent. This person said he had no authority to correct the mistake, but thought the matter would be all right. The passenger went to Quebec and spent several weeks, but on the way home was ejected from the train. The court rules that he was bound to know that the conductor had a right to refuse the ticket, and therefore, in boarding the train, was guilty of negligence barring a recovery in tort and rendering his damages merely nominal if his action is on contract. Brown, J., dissented on the ground that, under all the circumstances of the case, the question of contributory negligence was one for the jury.

The Supreme Court of Michigan rules that a track foreman was negligent who, while inspecting the track, ran a considerable distance on his tricycle without looking back, knowing that extra trains might come at any time.

In Michigan a brakeman was killed by being struck by logs which projected over the ends of cars which he was attempting to couple. Defendant offered evidence to show that deceased, who had made only a few trips on that branch of the road, had been cautioned against the danger of coupling cars loaded with logs, and put in evidence a rule of the company calling attention to the fact that logs often projected over the ends of the cars, and forbidding coupling by hand. Deceased was coupling in that manner when the accident occurred. Deceased was furnished with a copy of the rules, and promised to become familiar with and to be governed by them, and in the presence of an officer of the company he read the rule above referred to. The Supreme Court holds the railroad liable.

The Supreme Court of Michigan holds that a "road-master" is a superior servant for whose negligent acts the railroad is liable.

In Michigan in an action for the death of a freight conductor it appeared that he was in charge of a freight train; that he stopped his train at I. on the main track, as directed by the train dispatcher; that the dispatcher directed a freight train following intestate's train to "run extra" from C. to W. stations on either side of I.; that the following freight train ran into intestate's train at I., thereby causing intestate's death; that, owing to the down grade in approaching S., the ice on the track, and the speed at which the following train was running, such train could not be brought under control in time to prevent the collision. Rule 97 of defendant, which is furnished to all freight conductors and engineers, provides that "freight trains will approach all stations under full control, expecting to find trains using main tracks within station limits." The Supreme Court holds that a verdict should be directed for defendant, the engineer of the extra being a fellow servant of intestate, and the accident being caused by his negligence.

In Georgia, an employee of a railroad company, after examining a ladder resting against a coal car, and testing the security of its position, safely ascended it; but while he was at work in the car, the ladder, without his knowledge, was removed by another employee, who replaced it against the car apparently in the same position. Plaintiff, attempting to descend without re-examining the ladder or again testing the safety of its posi-

tion, it slipped, and he fell and was injured. The Supreme Court holds the railroad liable.²³

In the Federal Circuit Court it is ruled that a yardmaster in the service of a railroad company is not required to quit such service, although he knows of the dangerous condition of the company's car yard, provided the same is not so dangerous as to threaten immediate injury, or the condition of the car yard is not so dangerous but that the yardmaster, as a reasonably prudent man, can come to a well-grounded conclusion that he can safely perform his duty; and where the yardmaster is killed in the discharge of his duty, without contributory fault on his part, his wife and children may recover of the company.²⁴

In Pennsylvania the Supreme Court rules that a railroad company is not liable for an injury to a brakeman resulting from a bolt becoming loose and projecting from the end of a car which he was coupling, where there is no evidence that any person had knowledge of the defect prior to the accident.²⁵

- ¹ State v. Central Pac. R. Co., 30 Pac. Rep., 686.
- ² Fargo & S. W. R. Co. v. Brewer, 53 N. W. Rep., 177.
- ³ People v. Long Island Ry. Co., 31 N. E. Rep., 873.
- ⁴ Smith v. C. M. & St. P. R. Co., 53 N. W. Rep., 128.
- ⁵ Chappell v. N. Y., N. H. & H. R. Co., 24 Atl. Rep., 397.
- ⁶ Roby v. N. Y. C. & H. R. Co., 20 N. Y. S., 551.
- ⁷ C. & St. P. etc. R. Co. v. K. C., St. P. etc. R. Co., 52 Fed. Rep., 178.
- ⁸ Jackson v. State, 15 S. E. Rep., 905.
- ⁹ Boston & L. v. Nashua & L., 31 N. E. Rep., 1067.
- ¹⁰ Union Loan & Trust Co. v. Southern California Motor Road Co., 51 Fed. Rep., 840.
- ¹¹ F. S. Ry. Co. v. Hirst, (F.) 11 South. Rep., 506.
- ¹² C. R. & C. Ry. Co. v. Higgins, (G.) 15 S. E. Rep., 848.
- ¹³ E. T. V. & G. Ry. Co. v. Fleetwood (G.), 15 S. E. Rep., 778.
- ¹⁴ E. & D. R. Co. v. Jefferson, 16 S. E. Rep., 69.
- ¹⁵ Brown v. Barnes, (Pa. Sup.) 25 Atl. Rep., 144.
- ¹⁶ Wilcox v. R. & D. R. Co., 52 Fed. Rep., 264.
- ¹⁷ C. & E. I. R. Co. v. Conley, 32 N. E. Rep., 96.
- ¹⁸ Poullin v. Can. Pac. R. Co., 52 Fed. Rep., 197.
- ¹⁹ Jolly vs. D. L. & N. R. Co., 53 N. W. Rep., 526.
- ²⁰ Brennan vs. Mich. Cent. R. Co., 53 N. W. Rep., 358.
- ²¹ Palmer vs. Mich. Cent. R. Co., 53 N. W. Rep., 397.
- ²² Enright v. Toledo, A. A. & N. M. Ry. Co., 53 N. W. Rep., 536.
- ²³ R. & D. R. Co. v. Garner, 16 S. E. Rep., 110.
- ²⁴ Dwyer v. St. Louis & S. F. R. Co. (C. C.), 52 F. 87.
- ²⁵ Meusch v. Penn. R. Co., 25 Atl. Rep., 31.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Canadian Pacific, semi-annual, 2½ per cent., payable Feb. 17.

Chicago & Alton, quarterly, 2 per cent. on the common and preferred stock, payable March 1.

Cleveland & Pittsburgh, quarterly, 1½ per cent., payable March 1.

New York, Chicago & St. Louis, annual, 3 per cent. on the preferred stock, payable March 1.

Old Colony, quarterly, 1½ per cent., payable March 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Barclay, annual, Philadelphia, Pa., Feb. 18.

Bay of Quinte Railway & Navigation Co., annual, Deseronto, Ont., Feb. 15.

Connecticut River, special, Springfield, Mass., Feb. 17, to act upon the lease to the Boston & Maine.

Delaware, Lackawanna & Western, annual, New York City, Feb. 21.

Missouri Pacific, annual, New York City, March 14.

New York, Lackawanna & Western, annual, New York City, Feb. 21.

Norfolk & Southern, annual, Norfolk, Va., March 2.

Philadelphia & Erie, annual, Philadelphia, Pa., Feb. 13.

Pittsburgh, Cincinnati, Chicago & St. Louis, annual, Pittsburgh, Pa., April 11.

St. Louis, Iron Mountain & Southern, annual, New York City, March 14.

Texas & Pacific, annual, New York City, March 15.

Texas, Sabine Valley & Northwestern, special, Longview, Tex., Feb. 13, to increase the capital stock.

Velasco & Northern, annual, Velasco, Tex., Feb. 14.

Wheeling & Lake Erie, annual, Toledo, O., Feb. 14.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Freight Claim Association* will hold its semi-annual meeting in St. Louis, Mo., March 8, at the Southern Hotel.

The *New England Railroad Club* holds regular meetings at the United States Hotel, Beach street, Boston, Mass., on the second Wednesday of each alternate month, commencing January.

The *Western Railway Club* holds regular meetings on the third Thursday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* holds regular meetings on the third Thursday in each month, at 7:30 p. m., at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, N. Y.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m. in the directors' room of the St. Paul Union Station.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at Wesleyan Hall, Bromfield street, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month. The annual meeting is held on the third Saturday in January.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at

7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jackson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o'clock p. m. on the first Friday of each month.

The *Tacoma Society of Civil Engineers and Architects* holds regular meetings on the third Friday of each month, in its rooms, 201 and 202 Washington Building, Tacoma, Wash.

The *Association of Engineers of Virginia* holds informal meetings the third Wednesday of each month, from September to May inclusive, at 8 p. m., at the room of the Association, 710 Terry Building, Roanoke.

American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers held at the Society House on the evening of Feb. 1, a paper by Robert Cartwright, M. Am. Soc. C. E., on "The Construction of the Power House of the Rochester Power Company Adjacent to Genesee Falls, Rochester, N. Y.," was read and briefly discussed, as stated last week. A paper on "The Effect of Tuberculosis on the Delivery of a 48-in. Water Main," by James Duane, M. Am. Soc. C. E., was also read and brought out considerable discussion on pipes used in water-works, the general opinion being that the "tar coating" of pipes was the most effective preservative now known; Mr. Metcalf suggesting in regard to the "rustless" iron that the subjection of the iron to red heat and the application of steam afterward might seriously lower the strength of the iron before it was put into use, thus explaining its rapid failure in some of the cases mentioned.

The Secretary announced that the evening of Feb. 15 had been set apart for the discussion of the question of roadmaking, and the paper for the first meeting in March would be by Mr. L. G. Bouscaren on "Repairs of the Cincinnati Suspension Bridge."

The following persons were declared elected as members: Theodore Arthur Allen, Evansville, Ind.; Horace Lafayette Eaton, Somerville, Mass.; Frank Clark Hand, Atlanta, Ga.; Walter Harris Knight, Lynn, Mass.; William Bateman Lawson, Denver, Col.; George Herbert Leland, East Providence, R. I.; Augustus Mordecai, New York City; George Coffin Power, San Buenaventura, Cal.; George Herbert Webb, Lima, Peru. As associate member, Charles Henry Snow, New York City.

Boston Society of Civil Engineers.

A regular meeting was held at the society rooms, 36 Bromfield street, on Wednesday evening, Jan. 25, with President Henry Manley in the chair, and about 50 members and visitors present.

Mr. Edward P. Adams read the paper of the evening on the Light-House System of the United States. The paper covered in a very comprehensive manner the history and theory of lighting our coast, and the present organization of the system. The paper was illustrated by drawings and photographs of the various forms of light-houses, beacons, buoys, sirens, etc.

The reading of the paper was followed by a short discussion on the subject of the paper by Major W. R. Livermore, Engineer Corps, U. S. A., Light-house Engineer of the First and Second Districts, comprising the coast of Maine, New Hampshire and Massachusetts.

After passing a vote of thanks to Major Livermore for the delightful excursion he had given the members that afternoon to the light-houses in Boston Harbor the society adjourned.

At the meeting of the society to be held Feb. 15, Mr. W. E. McClintock will give an account of the work done by the Massachusetts Highway Commission.

Engineers' Society of Western Pennsylvania.

The Engineers' Society of Western Pennsylvania held its thirteenth annual meeting Jan. 17, President Alfred E. Hunt in the chair. The report of the Secretary gave the present membership as 420. Of the 116 admitted during the year, 57 are engineers or managers of industrial establishments, 51 chemists, 5 specialists and 2 unclassified. Ten regular meetings were held, at all of which papers or reports were submitted and discussed. The address of the retiring President was then read. The following officers were elected for the ensuing year: Max J. Becker, President; Thomas H. Johnson, Vice-President; Walter E. Koch and Emil Swenson, Directors; A. E. Frost, Treasurer; R. N. Clark, Secretary.

At the annual meeting of the Chemical Section, Jan. 24, Prof. Francis C. Phillips in the chair, the following officers were elected: Mr. Joseph H. Eastwick, Chairman; Mr. Fred Crabtree, Vice-Chairman; Mr. James O. Handy, Secretary; Mr. James Camp and Mr. George Faunce additional members of Board of Directors.

Prof. F. C. Phillips, the retiring Chairman, delivered an address, in which he referred at length to the giving of expert evidence before the courts. He deprecated the disrepute into which such evidence was sometimes thrown by the too great zeal of chemical experts to make out a strong case for the clients by whom they were employed. Such zeal might often lead to the suppression of certain facts and undue emphasizing of others.

The annual dinner was held at the Duquesne Club, Jan. 26. One hundred and one members and guests were present. After the dinner the following toasts were responded to, Mr. Max J. Becker being toastmaster: "Where Are We at?" W. G. Wilkins; "Salts," J. H. Eastwick; "Water," George H. Browne; "Rocks," Walter E. Koch; "Microbes," Charles R. Dudley; "Stains," George H. Hutchinson; "Ties," Thomas H. Johnson; "Bricks," George S. Davidson.

Engineering Association of the South.

The January meeting of the Association was held at the rooms in Nashville, Tenn., on Jan. 12, 1893, Maj. E. C. Lewis presiding. Mr. Hunter McDonald, who had been appointed to prepare a memorial on the late Col. R. C. Morris, Chief Engineer of the Nashville, Chattanooga & St. Louis Railroad, submitted the memorial, which was ordered to be printed. Maj. W. F. Foster presented a description of the development of the water-power at Estill Springs, Tenn.

Engineers' Club of St. Louis.

The club met Feb. 1, 1893, at 8 p. m., at the Club rooms, President Moore in the chair, and 27 members and one visitor present. Mr. J. W. Schaub read a paper on "The Detroit Union Depot Viaduct." The paper covered the full details of the design and construction of the viaduct, and was fully illustrated by drawings and photographs. Discussions followed by Messrs. Flad, Johnson, Baier, Nipher, Crandon, Crosby Moore, McMath and Bruner. For the next meeting a paper by Mr. O. W. Ferguson on "Precise Levels: Its Methods and Its Results" is announced.

PERSONAL.

—Capt. James A. Parsons, of Davis, W. Va., for 12 years Chief Engineer of the West Virginia Central & Pittsburgh railroad and its connecting lines, died at his home Feb. 2.

—Mr. William Graves, who became Vice-President and General Manager of the North Pacific Coast Road last summer, has resigned those positions. No successor will be appointed for the present.

—Judge Thomas E. Withrow, General Counsel for the Chicago, Rock Island & Pacific, died suddenly at Chicago, Feb. 3. Judge Withrow was appointed General Solicitor for the Chicago, Rock Island & Pacific in 1872 and in 1890 was made General Counsel.

—The illness of Mr. James Brown has compelled his resignation as Assistant General Passenger Agent of the Union Pacific. He has gone to Mount Clemens, Mich., and his position has been filled by the promotion of his Chief Clerk, Mr. Charles McKensie.

—Mr. T. M. Bates, who recently resigned as Superintendent of Transportation of the Chicago & Alton, has been appointed Superintendent of the Indiana, Illinois & Iowa Road, succeeding Mr. Charles H. Smith, who has resigned to accept service on another road.

—Mr. Arthur H. Johnson has resigned the position now held by him as Engineer of Signals on the New York, Lake Erie & Western Railroad. He has been appointed Consulting Engineer of the Hall Signal Company and the Johnson Railroad Signal Company, with office at 47 Broadway, New York City.

—Mr. Charles H. Goodrich, formerly Assistant General Freight Agent of the New York & New England road, who, it was reported, was to be appointed to a similar position with the Philadelphia & Reading, has been appointed Agent of the Lake Shore & Lehigh Valley route, at 235 Broadway, New York City.

—Mr. J. L. Frey, recently General Superintendent of the Missouri, Kansas & Texas, assumed charge on Feb. 1 of the Sherman, Shreveport & Southern Road, formerly the East Line & Red River, one of the Texas lines of the Missouri, Kansas & Texas. His title is Vice-President and General Manager, with headquarters at Greenville, Tex.

—Mr. L. A. Robinson, who has been appointed General Passenger Agent of the Pittsburgh & Lake Erie road, has been Traveling Passenger Agent of the Lake Shore & Michigan Southern. He is about 28 years old, and has been in railroad service about 13 years, first as telegraph operator on the Lake Shore road. In 1888 he was appointed Traveling Passenger Agent.

—Mr. W. Howard White, civil engineer, from his residence at Redlands, Cal., announces that he is prepared to investigate and report upon business enterprises or engineering work in his region. As an eminent civil engineer of unusually wide experience and a man of high character and business ability, Mr. White is entitled to entire confidence. He was at one time editor of the *Railroad Gazette*.

—Mr. George F. Evans, who became Superintendent of the Southern Division of the Boston & Maine in March, 1892, has been appointed General Manager of the Connecticut River Road, now operated by the Boston & Maine. Mr. Evans was General Manager of the Louisville, Evansville & St. Louis for eight years, and has been connected with other Southern railroads, being now about 41 years of age.

—Mr. George H. Pegram, who has succeeded Col. E. C. Smeed as Chief Engineer of the Union Pacific, was formerly Chief Engineer of the Missouri, but has been a consulting engineer with office at St. Louis, for several years. Mr. Pegram began his career in the construction department of the Utah & Northern. Later he was Engineer of the Edge Moor Bridge Works. He then became Assistant Chief Engineer of the Missouri Pacific, and while with that road built the station at St. Louis.

—Col. A. C. Dawer, formerly General Passenger and Ticket Agent of the Burlington lines in Missouri, died at Tampa, Fla., Feb. 3, whither he had been removed last fall. Col. Dawer suffered from Bright's disease, and became so ill last summer that he resigned his position and was removed to Florida, and has constantly lost strength. He was 65 years of age. In 1863 he removed from Quincy, Ill., to St. Joseph, Mo., and became General Passenger Agent of the Missouri Valley road. On the extension of the road and its consolidation with

the Kansas City, St. Joseph & Council Bluffs he was made General Passenger and Ticket Agent of both. This position he retained until a consolidation was effected between the Hannibal & St. Joseph and the Kansas City, St. Joseph & Council Bluffs road under the Burlington system, when the new additions were placed under his jurisdiction.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—A new general division, called the Pittsburgh & Allegheny Division, has been formed, with J. V. Patton as General Superintendent. The new division includes the main line and leased lines of the Pittsburgh & Western, and the Pittsburgh & Connellsville Division, with its branches, and including the Wheeling & Pittsburgh Division, also of the Baltimore & Ohio. Mr. Patton has had charge of the Pittsburgh & Western as General Manager and General Superintendent for two years past, and for five years previous was Superintendent of the Pittsburgh Division of the Baltimore & Ohio.

Birmingham, Sheffield & Tennessee River.—E. A. Hopkins has been elected President of this company, with office at Philadelphia, Pa., vice A. Parrish.

Birmingham & Atlantic.—G. A. Mattison, who has been Master of Transportation for the past two years, has been appointed Superintendent, with headquarters at Talladega, Ala. He has been connected with the East Tennessee, Virginia & Georgia and Richmond & Danville systems.

Brownsville & State Line.—The incorporators of this Pennsylvania road are: Henry D. Welsh, Philadelphia, President; R. D. Barclay, John P. Green and Amos R. Little, Philadelphia; W. A. Patton, Radnor, Pa.; N. Parker Shortlege, Wynnewood, Pa., and Samuel Rea, Bryn Mawr, Pa.

Bustleton & Eastern.—The following are the directors of this new Pennsylvania road: Samuel Rea, Philadelphia, of the Pennsylvania road, President; Wm. A. Patton, Radnor, Pa.; A. D. Barclay, John P. Green, Henry D. Welsh, Thos. D. Whitaker and Geo. Wood, Philadelphia.

Centralia & Chester.—E. A. Burrill has been appointed General Freight and Passenger Agent and Auditor of this company, with office at Sparta, Ill.

Chicago Great Western.—J. L. Bass has been appointed Car Service Agent vice Joseph R. Cavanaugh, resigned to accept service with another company. John Warwick, Purchasing Agent, will in the future have charge of the fuel and tie department.

Chickamauga & Durham.—P. J. Murphy has been appointed Superintendent and Treasurer, vice Gordon Lee, formerly Treasurer, with office at Chickamauga, Ga.

Cleveland, Cincinnati, Chicago & St. Louis.—Joseph R. Cavanaugh has been appointed Car Service Agent.

Des Moines Union.—J. A. Wagner has been appointed Superintendent of the road, vice Horace Seeley, who resigned to accept service with the Des Moines & Western.

Eagle's Mere.—At the annual meeting held in Philadelphia, Jan. 9, these officers were elected: President, C. William Widdrop, Hughesville, Pa.; Vice-President, John B. T. Ryan, Williamsport; Secretary and Treasurer, B. Harvey Welch, Hughesville.

Fremont, Elkhorn & Missouri Valley.—John B. Berry has been appointed Chief Engineer of the Fremont, Elkhorn & Missouri Valley road and the Sioux City & Pacific, and will also have charge of the Missouri Valley & Blair Railway and Bridge, vice J. E. Ainsworth, resigned.

Green Bay, Winona & St. Paul.—W. H. Leupp has been elected Secretary and Treasurer of this company, with office at 52 Wall street, New York, vice Theodore Sturges.

Huntingdon & Broad Top.—The annual meeting was held at Philadelphia, Feb. 7, and the following directors were elected: President, Spencer M. Janney; Directors, James Long, James Whitaker, Thomas R. Patton, Jacob Naylor, William Bault, Samuel Bancroft, Jr., Johns Hopkins, George H. Colke, Robert H. Crozer, William H. Shallcross, Lewis A. Riley and Samuel Hilder.

Indiana, Illinois & Iowa.—C. H. Smith has resigned his position as Superintendent, and has been succeeded by T. M. Bates, formerly Superintendent of Transportation on the Chicago & Alton. Mr. Smith has accepted a position as Superintendent of an Indiana road.

Interoceanic (Mexico).—L. I. Nunn, previously Superintendent of the Vera Cruz Division, has been appointed General Freight and Passenger Agent, with headquarters at City of Mexico.

Iowa Central.—W. H. Voorhies for 20 years in the service of the Iowa Central as brakeman, conductor and trainmaster, has been appointed Assistant Superintendent of the North and South divisions, with headquarters at Marshalltown, Ia.

Jacksonville & Atlantic.—This short Florida road was recently purchased by M. W. Drew and the new company has elected officers as follows: M. W. Drew, President; J. W. Archibald, Vice-President; B. P. Hazeltine, Treasurer, and W. A. Macduff, Secretary.

Keokuk & Western.—At the annual meeting of the stockholders at Keokuk, Ia., Feb. 1, the following directors were elected: A. C. Goodrich and F. T. Hughes, of Keokuk; G. H. Candee, of Lowell, Mass.; T. Dewitt Cuyler, of Philadelphia; Gen. F. M. Drake, of Centerville, Ia., and Francis Paton, Benjamin Strong, Benjamin Graham and W. H. Gebhard, of New York.

Lehigh Valley.—Joseph W. Pascoe has been appointed Superintendent of Bridges with office at Easton, Pa., to succeed his brother, W. F. Pascoe, who resigned to become Superintendent of the National Switch and Signal Works, at Easton.

Madison, Alton & Chicago.—R. H. Parks has been appointed Superintendent, vice Geo. T. Anderson, resigned, with office at St. Louis, Mo.

Massillon & Cleveland.—The annual meeting was held in Massillon, O., Feb. 7. The Directors elected were: John Sherman, Mansfield; Peter G. Albright, Massillon; L. B. Harrison, William Hooper, Cincinnati; Mark A. Hanna, Cleveland, O.; William F. Robb, Pittsburgh; Charles W. Cass, Henry Amy and Charles Lanier, New York City. Officers: Charles W. Cass, President, New

York, and John J. Haley, Secretary and Treasurer, Pittsburgh.

Mexico, Cuernavaca & Pacific.—The annual meeting of the stockholders was held in Denver, Jan. 30, and the following directors were elected: J. H. Hapson, D. B. Smith, W. O. Staples, Juan Certucha and Ignacio Sepulveda, of Mexico City; Charles Wheeler and George L. Hodges, of Denver. The directors elected J. H. Hapson, President, D. B. Smith, Vice-President and General Manager; C. Wheeler, Secretary; W. O. Staples, Treasurer. The principal offices are in Denver.

Middle Tennessee & Alabama.—The following Directors were elected last week: J. Edward Simmons, New York; R. D. Warner, Fayetteville, Tenn.; Garrett A. Hobart, New Jersey; Daniel Lord, David Wilcox, New York; John T. Cross, Alabama, and Earnest Caldwell, Shelbyville. The Directors elected the following officers: Edward Simmons, President; David Wilcox, Secretary and Treasurer, and Robert D. Warner, Vice-President.

Monterey & Fresno.—The directors of this new California company met recently at Fresno, Cal., and the following officers were elected: President, Col. A. W. Jones; Vice-President, H. A. Greene; Secretary, L. W. Moultrie; Treasurer, T. C. White. President Jones appointed H. A. Greene Acting General Manager and Frank P. McCray Civil Engineer. The headquarters are at Fresno, Cal.

Norfolk & Western.—Charles G. Eddy, Vice-President in charge of the traffic department, having resigned to accept the position of Second Vice-President of the Philadelphia & Reading, the General Freight Agent and the General Passenger Agent will, until further notice, report to the President. After Feb. 15 all communications relative to freight traffic should be addressed to T. S. Davant, General Freight Agent, Roanoke, Va., and all communications relative to passenger traffic should be addressed to W. B. Bevil, General Passenger Agent, Roanoke, Va.

Pawnee.—C. E. Clayton, Secretary and Auditor, having resigned the office of Auditor, D. A. Dreunon has been appointed Auditor, with office at Pawnee, Ill.

Philadelphia Belt Line.—Sidney Williams has been appointed General Manager of this road. He was formerly General Manager of the Pacific Fast Fruit Line, between California and New York. He was also at one time Assistant Superintendent of the Eastern of Minnesota, a portion of the Great Northern system.

Philadelphia, Reading & New England.—At the annual meeting in New York directors were elected as follows: A. A. McLeod, C. Tower, Jr., W. W. Gibbs, James Armstrong, John H. Taylor, Maurice A. Viele, Arthur Brock, Joseph F. Sinnott, John W. Brock, Charles Hartshorne, W. W. Jenks, Charles E. Morgan, Jr., Pierson Brown.

Providence & Worcester.—At the annual meeting of the stockholders at Providence, R. I., Feb. 6, the following board of directors was elected: M. B. I. Goddard, Joseph E. Davis, Jonas G. Clark, John W. Danielson, G. Marston Whitin, A. George Bullock and John Nicholas Brown.

Queen & Crescent.—The Cincinnati, New Orleans & Texas Pacific will hereafter be operated in two divisions, and W. J. Murphy, recently Division Superintendent of the East Tennessee, Virginia & Georgia, has been appointed Superintendent of the Cincinnati Division, with headquarters at Lexington, Ky. A. Griggs, now Superintendent, with headquarters at Somerset, Ky., will be Division Superintendent in charge of the line from Somerset to Chattanooga.

Quincy, Omaha & Kansas City.—J. H. Best having resigned as Traffic Manager, the office has been abolished. Frank W. Evatt has been appointed General Freight and Passenger Agent, with office at Quincy, Ill. C. H. Spencer has been appointed Assistant General Freight and Passenger Agent.

Rio Grande Northern.—The incorporators are R. E. Russell, of San Francisco; John P. Ober, Allegheny City, Pa.; Marshall Johnson and D. H. Beckert, Pittsburgh, Pa.; John C. Bardall, Moundville, W. Va.; Martin Zeibert, Allegheny City; W. B. Brack, G. T. Marshall, H. B. Stevens, El Paso, and Thomas M. Murphy, of Marfa, Tex.

Sherman, Shreveport & Southern.—The incorporators of this Texas road, a reorganization of the East Line & Red River road, are as follows: J. J. Frey, Wm. Gles, Thomas Randolph, W. B. Munson, W. A. Williams, T. H. King and A. Atkins as directors.

Texas Midland.—The officers of this company are as follows: E. H. R. Green, President and General Manager; Joseph McWilliams, Chief Engineer and General Superintendent; J. W. Culver, Assistant Freight and Passenger Agent, all with offices at Terrell, Tex.

Union Pacific.—George H. Pegram has been appointed Chief Engineer, with headquarters at Omaha, Neb.

Winona, Marshalltown & Southern Railroad & Coal Co.—The officers of the company, recently chartered in Iowa, are as follows: N. S. Ketchum, President; G. F. Kirby, Vice-President; A. G. Glick, Secretary, and C. C. Gilman, Chief Engineer, all of Marshalltown, Ia. These officers are directors and also E. S. Fonda, of Osage, Ia., Chris C. Schuler, of Grundy Center, Ia., and E. B. Woodruff, of Knoxville, Ia.

Wisconsin Central.—J. C. McCutchen has been appointed Assistant General Freight Agent of the Wisconsin Central lines, vice J. C. Mackinnon, resigned, with office at Chicago.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Aberdeen & Rock Fish.—About six miles of this line is now completed from Aberdeen, N. C., on the Seaboard Air Line, and the road will be extended some distance further during the Spring. John Blue of Aberdeen, is president.

Alberta Railway & Coal Company.—The Canadian Pacific is reported to have secured control of the railroad operated by this company from Dunmore, Can., on the Canadian Pacific west to Lethbridge in Alberta, a distance of 109 miles. The company also controls the Great Falls & Canada road from Lethbridge south to Great Falls, Mont., 200 miles, which was built in 1891. The line will probably be extended by the Canadian Pacific west from Lethbridge to the Crow's Nest Pass in the Rocky Mountains.

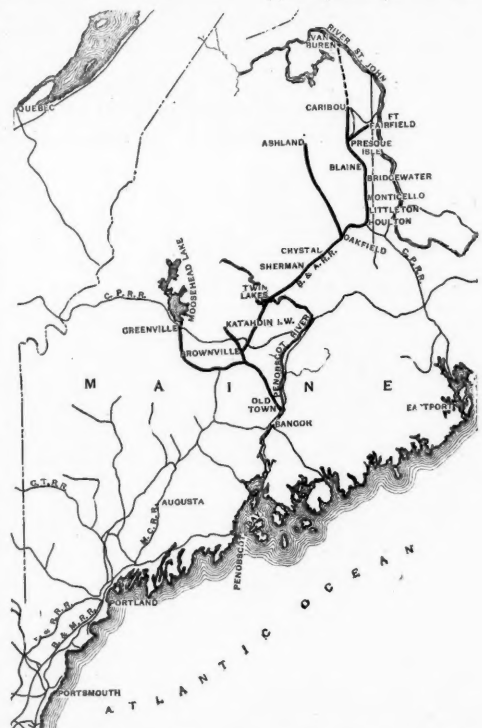
Ambler Lumber Company.—Surveys have been recently made for a proposed extension of the road owned by this company through the phosphate lands in Alachua County, Fla., west to the Suwannee River. The local papers state that the construction work will begin in a few days at a point west of Starke, Fla. The road owned by the company was built in 1891, and is 28 miles long from Archer, Fla., to Eagle Mine in the phosphate region, and is operated by the Florida Central & Peninsular as part of its Cedar Key Division.

Arcata & Mad River.—This road is being slowly extended through Humboldt County, through the lumber district in the northern part of California. The line starts from Humboldt Bay, on the Pacific coast, and reaches Arcata, Blue Lake, Korbel and Cannon Creek, 24 miles altogether. The line was extended last year about four miles, and probably the same amount of new road will be built this year. F. Korbel, of San Francisco, is President.

Aspen & Maroon.—This company, which has been organized at Aspen, Col., proposes to build a road from Aspen westerly to Maroon Creek, thence in a southerly direction to the head of the creek. The directors are: Walter S. Clark, Henry W. Stormer, Charles E. Shriver, J. E. Freeman, William O'Brien and H. A. Rogers, of Aspen, and J. C. Bates, of Denver, Col.

Astoria & Portland.—An effort is now being made to reorganize this company, and it is said that there is little doubt that the construction work which was suspended last October will be resumed this spring or early in the summer. Corey Brothers & Co., of Ogden, Utah, have the contract for grading the line from the terminus of the old Astoria & South Coast road, south of Astoria, Ore., toward Portland, and when the work is resumed it will be under a new contract with that firm.

Bangor & Aroostook.—This line, the location of which is shown on the accompanying map, is the longest road placed under construction in the New England states since the Central Massachusetts was finished five or six years ago. The main line is from Brownville to Caribou and Van Buren, Me., 177 miles, with branches to Ashland and Fort Fairfield, 232 miles altogether. The line from Oldtown, which is about 12 miles east of Ban-



gor, to Greenville, 77 miles, and the Kathadin Iron Works branch, is the old Bangor & Piscataquis road which was leased to the Bangor & Aroostook last summer by the city of Bangor, which owns the majority of the stock and bonds. The new line begins at Brownville on the Kathadin Iron Works branch, 45 miles from Bangor. From Brownville to Houlton, about ninety-four miles, the line passes through Piscataquis, Penobscot and Aroostook counties, largely through wooded land, but near and through some well settled country. The principal streams crossed are the west branch of the Penobscot, Milnocket, east branch of the Penobscot, Fish Stream, west and east branches of the Mattawamkeag, and two branches of the Meduxnekeag. From Houlton to Van Buren, on the St. John River, 83 miles, is almost entirely through a well settled and thrifty country, some portions of this distance being well developed agriculturally. The principal streams on this section are the north branch of the Meduxnekeag and the Aroostook River and Madawaska stream. On the Ashland branch, 42 miles, are the St. Croix and Squapan streams, and on the Fort Fairfield branch, 13 miles, there are no large streams.

The country is undulating but not rough. The ruling grades are 66 ft. a mile rising north, and 53 ft. a mile rising south. The sharpest curves are six degrees, with the exception of three or four of eight degrees at junction points and approaching bridges, where the valleys are confined and narrow. The lowest elevation on the new line is about 320 ft. above sea level, and the highest are 750 ft. between Caribou and Van Buren, 745 ft. on the Ashland branch, 680 ft. on Fort Fairfield branch and 644 between Brownville and Houlton.

The industries at present are chiefly agricultural and lumber, but there are also slate and granite quarries and considerable manufacturing, the latter chiefly of lumber and products of wood, such as spools and last blocks, wood pulp for paper, etc. The natural facilities for manufacturing are excellent water powers at the crossings of the principal branches of the Penobscot River, the Mattawamkeag at Island Falls, three branches of the Meduxnekeag, and the Aroostook River, etc., where magnificent undeveloped water powers exist. The rivers above the crossings afford means of transportation and storage for the logs to be manufactured. The timber lands are capable of producing an entirely new crop

every 15 years, or an average of about a thousand feet superficial per acre every year. Much of the land, though considered unfit for farming, is an excellent timber producing soil, being of a deep, though stony description. Of agricultural land there is a large and rapidly developing area, especially in the eastern and northern parts of Aroostook County. A large portion of this has as yet been developed only sufficiently for the production of such farm products as find a market among the lumbermen, and is therefore capable of considerable growth and production. The Aroostook Valley, which is perhaps the most productive part of the state, has had almost phenomenal increase of business and valuation since the building of a branch of the New Brunswick railroad to Presque Isle in 1881, but this gives a long and circuitous route. The principal farm products are hay, oats and potatoes, and the latter forms the largest article of export. But little wheat is raised and none shipped. The average crop of potatoes compared with wheat is 10 to 1 in quantity, and the value for an equal amount of potatoes averages about 60 to 90 per cent. that of wheat, a much better return to farmers than wheat gives, as well as affording ten times the business per acre to the carriers.

Nearly 40 miles of grading has been done on the line between Sherman and Houlton and a few miles near Brownville, including the culvert masonry, and a large amount of bridge masonry. It is the company's intention to have trains running to Houlton by fall.

Nearly 500 men have been working through the winter and this force will be largely increased in the spring to complete the work between Brownville and Houlton. The grading already done on this section includes the heaviest work on the line. There are a number of heavy fills and cuts on the line to Houlton, but the average grading is 15,000 cu. yds. of excavation a mile. C. P. Treat, of Chicago, is the contractor. There are about 30 spans of iron bridge from 60 to 150 ft. in length, and about 30 from 25 to 50 ft. plate girders; one iron trestle 360 ft. in length, and about 2,000 lin. ft. of wooden trestle. A. A. Burleigh, of Bangor, is President, and F. W. Cram, of Bangor, is General Manager, and Moses Burpee, of Houlton, is Chief Engineer.

British Columbia Roads.—Application has been made to Parliament for an act to incorporate a company for the purpose of constructing and equipping a road from a point on the Columbia River, near the southern boundary of British Columbia, northwest to Kootenay Lake, near the town of Nelson, via Salmon River and Cottonwood-Smith Creek.

Application is made to Parliament for an act to incorporate a company to construct a line in the Province of British Columbia from a point near Nakusp, in Upper Arrow Lake, Kootenay District, to the Forks of Carpenter Creek, with power to extend to Bear Lake and to Cody Creek.

Brownsville & State Line.—The charter for this line was filed at Harrisburg, Pa., this week, to build a branch of the Pennsylvania from a connection with the Pittsburgh, Virginia & Charleston road in the valley of the Monongahela River near the borough of Brownsville, to a point in the same valley near the state line between West Virginia and Pennsylvania. The length of the line is about 34 miles. H. D. Welch, of the Pennsylvania road, is President.

Bustleton & Eastern.—A charter for this road was filed at Harrisburg, Pa., last week. The proposed road is to extend from a point on the Philadelphia & Bustleton at Bustleton (Philadelphia) in a northeasterly direction to near Fallsington, Bucks County, Pa., on the Trenton Cut Off road, 15 miles. It will form a new connection for the Pennsylvania between Philadelphia and Trenton, N. J. Samuel Rea, of Philadelphia, is President.

Camden Belt Line.—The project for a belt line at Camden, N. J., has been revived, and at a meeting of the Board of Public Works at Camden last week an ordinance was introduced, by request of the Camden Board of Trade, giving permission to the Atlantic City Railroad and the Pennsylvania Railroad to lay track on the river front, between Kaighn's Point and Cooper's Point, for the purpose of establishing a belt line railroad.

Chicago & North Shore Belt Line.—Articles of incorporation of the company were filed at Springfield, Ill., Feb. 3. It is proposed to build a road from a point on the Illinois and Wisconsin state line, near Spring Bluff Station to Waukegan, Wis. The capital stock is \$200,000, and the incorporators are Charles H. Whiting, Robert E. Ismond, James H. Vanslissingen, Samuel J. Howe, Frank S. Reed, John E. Coleman and Hugh A. Jones.

Chicago & Northwestern.—The local papers in Wisconsin state that construction material is being delivered at Necedah, Wis., for a proposed branch of this road to be built during the coming summer from that town east to Princeton, Wis., the western terminus of the Sheboygan & Western road, which is operated by the company. The line will be about 45 miles long, and its construction will give the company a new route from Chicago and Milwaukee to Minneapolis shorter than the present line through Madison, Wis.

Creede & Gunnison.—C. A. King, of Amethyst Col., the Chief Engineer, has located the line from Creede to the Amethyst mines, a distance of 12 miles. The line is projected to extend across the mountains to Gunnison, Col., but on account of the snow no further work will be done until the spring, but the line will probably not be extended beyond Amethyst. It has been located up the mountains with grades of four per cent. and a curvature of 24 degrees, and spurs are proposed to reach all the producing mines in the Cripple Creek district. The organization of the company is not completed, but the articles of incorporation will be soon filed.

Denver & Rio Grande.—The grading on the branch from Crested Butte to the coal mines of the Colorado Fuel and Iron Company, about seven miles distant, which is being built in connection with the Union Pacific, has been suspended on account of the heavy snow, which is seven feet deep in some places. President Jeffery when asked last week by a newspaper reporter whether the company would do any new construction work this year, replied that several new lines would undoubtedly be built, but as his plans were not complete, he could not make any detailed statement at present.

Fairmont, Morgantown & Pittsburgh.—Work on this line from Morgantown, W. Va., north, which had been discontinued for four or five weeks on account of deep snow and severe weather, was resumed Feb. 1. The grading is almost entirely done to Point Marion,

Pa., and most of the force is at work on the ballasting. The tunnel at Morris Cross Roads is nearing completion. The piers for the Cheat River Bridge, which were out of reach of high water before the cold weather began but which are not yet finished, had as severe a test last week as they are likely to ever have. The ice in Cheat River and heavy logs became massed against the piers and backed the water up till it rose ten feet. The current was powerful, but the unfinished piers held it for fully two hours till the ice and logs gave way. Work on the bridge will be resumed as soon as the engineers feel assured that there is no further danger from ice. The track laying will be commenced from both ends of the line about March 1.

Fall Brook.—B. W. Wellington and Engineer Alfred J. Hines, of Corning, N. Y., have secured the contract for the branch railroad from Mills to Ulysses, Pa., seven miles. They will begin work at once, and will have the line completed by July 18.

Gulf & Pacific.—George M. Hard, Henry S. Redmond, Charles A. Ray, Charles H. Payne, George Y. Renshaw and I. E. Blake have incorporated this company in Colorado. The purpose is to build a road from Trovino, on the Monterey & Mexican Gulf Railroad, in the State of Coahuila, Mexico, west to the Sierra Madre mining district.

Harriman & Nashville.—The charter of this company has been filed at Nashville, Tenn., the incorporators being W. T. Smith, W. C. Harriman, A. R. McKenzie, G. W. Pearsall and J. B. Stearns. The route is to be from Harriman, in Roane County, up the valley of the Emory and Obed rivers, through the counties of Morgan, Cumberland, Putnam or White, Smith or DeKalb, Cannon, Wilson or Rutherford, and Davidson to Nashville, Tenn.

Jacksonville, St. Augustine & Halifax River.—The extension along the east coast of Florida to Rockledge was opened for regular passenger traffic Feb. 6, two trains being run daily between St. Augustine and Rockledge. The extension is 65 miles long, beginning at Daytona, Rockledge, the southern terminus being 140 miles south of St. Augustine. Surveys have been made for a further extension of the line south to Melbourne, about 30 miles, and it is reported that the contract for building the line to that point has been recently awarded.

Lake Erie Alliance Southern.—The City Council of Steubenville and the County Commissioners of Jefferson County, O., of which Steubenville is the county seat, are endeavoring to secure an extension of this line from Bergholz, O., to Steubenville, a distance of 22 miles, and they have appointed a joint committee to investigate as to the advisability of lending aid to the project and what inducements the company would require. The line in question has been surveyed several times. Considerable grading was done several years ago, but financial difficulties enforced its abandonment.

Lake Street Elevated (Chicago).—At a meeting of the stockholders in Chicago Feb. 1 the directors of the company were given full power to close a contract with the construction company to build the 7½ miles of road during the present year. The old company surrendered control and the Eastern capitalists now dominate affairs. The stockholders further agreed yesterday to increase the capital stock of the company in the near future from \$5,000,000 to \$10,000,000, and empowered the directors to issue \$6,500,000 in first mortgage bonds bearing 5 per cent. interest. This issue of bonds is intended to pay for the construction of the road.

Montana Southeastern.—Articles of incorporation of the company were filed in Montana last week by Henry L. Frank, Lee Mantle, Charles S. Warren, George W. Irvin, W. McWhite and N. C. Ray, of Butte. The route of the proposed road is given as follows: Beginning at a point near Butte, thence southeasterly up Black Tail Creek to the summit of the main range of the Rockies; easterly to and along the valleys of the Jefferson and Ruby rivers to the summit of the Rockies in Madison County, with a branch to Bozeman and southerly to Dillon. The principal office of the company is to be at Butte, Mont.

Neuse & Swansboro.—Cyrus Fausc, J. C. Pittman, Joseph Sabiston and J. J. Hines will apply to the North Carolina Legislature for a charter for this road to be built from Riverdale via Stella to Swansboro, through the counties of Craven, Carteret and Jones.

New Roads.—W. Davis, F. E. Rogers and George Parker are the incorporators of a road to extend from Waco to Moody, Tex., through the counties of McLennan, Falls, Milam, Bell's, Williamson and Travis, a distance of 28 miles.

J. W. Orland, O. D. Harris and others of Whitney, Tex., are organizing a company to build a connecting line from Whitney on the Texas Central west to Hillsboro, a distance of about 12 miles. A charter for the line will be secured shortly and the organization completed. The directors are J. W. Orland, W. H. Abernathy, O. D. Harris, Gip Smith, P. M. Greenwade, D. Landman and J. T. Mayes.

North Galveston, Houston & Kansas City.—The line between Virginia Point and North Galveston, Tex., about 19 miles, has been completed, and the station, roundhouse and sidings at North Galveston have been finished. The extension to Clear Creek, eight miles, was placed under contract last week. The name of the contractor is not given, but it is probably J. P. Nelson, of Houston. The work will be very light, as the route is over a prairie country. Connection will be made at Clear Creek with the La Porte, Houston & Northern, which is now extending its line to that point.

Perry County.—The track was laid last week to within a mile of Loysville, Pa., and will reach that town this week. Stations are now being erected at that point and at Landisburg. This extension is 12 miles long, beginning at Bloomfield, Pa., and has been in operation during February to Landisburg, 10 miles, the grading having been completed to Loysville, two miles beyond last year.

Philadelphia, Wilmington & Baltimore.—Superintendent C. J. Bechtolt, of Media, Pa., has recently had surveys made for the extension of the second track on the Central Division from Glen Riddle, Pa., and work will begin as soon as the right of way has been secured to Darlington.

Pueblo, Gunnison & Pacific.—The Colorado papers report that the right of way of this company will shortly be turned over to the Missouri Pacific and a portion of the line will be built. The line was surveyed several years ago from Pueblo south to Walsenburg and San Luis Valley, Col., about 120 miles, by H. R. Holbrook, of Pueblo.

Raleigh & Western.—This company is building an extension of the Egypt Railroad which is now in operation from Colon on the Seaboard Air Line west to Egypt, N. C., eight miles. The locating survey is now being completed by Chief Engineer J. J. Sickler into Ashboro, N. C., on the Richmond & Danville, about 40 miles west of Egypt. The officers expect that the road will be in operation as far as Ashboro within the next six months. The Deep River will be crossed twice on this division and each bridge will be about 160 ft. in length. It is also proposed to extend the road east from Colon to Goldsborough on the Atlantic Coast Line. The principal business will be handling coal from the Egypt mines in Chatham County, N. C. These mines are now having an increased plant introduced, and in a short time will have a capacity of over 500 tons a day with the intention of enlarging to at least 1,000 tons daily, all of which product will be consumed within the states of North Carolina and South Carolina. The distribution of this tonnage guarantees a profitable business over the road from the start. In addition to this large bodies of timber heretofore remote will be made accessible. Samuel A. Henszey, of Egypt, is President.

Rio Grande Northern.—This company filed a charter in Texas last week, the incorporators being G. T. Marshall, of El Paso, Tex., and others. The road is to extend from Van Horn Station on the Texas & Pacific, El Paso County, southerly, crossing the Southern Pacific between Chispa and Haskell stations, thence south through Van Horn Gap in the mountains, and to Soldiers' Spring, through Brock's Cañon to the Rio Grande in Presidio County.

St. Louis, Richibucto & Buctouche.—This company is applying to the Parliament of Canada for an act authorizing the construction of a line from Buctouche, N. B., north to Kingston, and for the power to construct a bridge across the Richibucto River, near Kingston, N. B. The line is to connect the Buctouche & Moncton, with the Kent Northern road.

Sandusky & Columbus Short Line.—The work of ballasting has been continued through the winter on this line, and as soon as the weather becomes more favorable the work will be rapidly completed. Trains have been run over the entire line from Sandusky south to Columbus, 108 miles, but the line will not be opened for regular freight service until March 1. The station buildings are now being erected, and passenger trains will probably begin running early in April from the Union station in Columbus.

Sea View.—Charles I. Rawson, J. T. Stoddard, John Bradley, E. L. Collins and R. C. Gilchrist have applied for a charter for this road, with a capital stock of \$200,000. It is proposed to build from Hog Island, in Charleston Harbor, through Mt. Pleasant and Moultrieville to the east side of Sullivan's Island, known as Seaview City.

Sherman, Shreveport & Southern.—A charter for this company was filed in Texas last week. The company is a reorganization of the East Line & Red River, which owned a narrow gauge road from Greenville east to Jefferson, Tex., 122 miles, and a standard gauge line from Greenville west to McKinney, 30 miles. The stock of this company was owned by the Missouri, Kansas & Texas, but in 1887 the line was separated from that system, and an agreement was made with the Texas State government to change the line to standard gauge and secure a new state charter. The Attorney General of Texas had instituted suits to declare the charter of the road forfeited, but they were withdrawn when this agreement was made.

Star Mountain.—A charter has been filed at Knoxville, Tenn., incorporating this company, to construct a road from the Hiawasee River to the headwaters of the Conasauga Creek, in Monroe County, to gain access to the Star Mountain iron regions. The incorporators are T. E. Teagarden, Moses Greer, Jr., H. J. McCook and J. W. Caldwell.

Temiscuata.—The company has just formally applied to the Dominion Parliament for power to build the proposed extension along the River St. John, from Edmundston southeast to St. Leonards, N. B., and to erect a railroad bridge across the St. John River near St. Leonards to connect with the Bangor & Aroostook road now under construction through Maine, near its proposed northern terminus at Van Buren. The extension will be about 20 miles long.

Union Pacific.—While in Colorado last week, President S. H. Clark, General Manager E. Dickinson, of Omaha; W. A. Deuel, General Superintendent of the Gulf Division, all of the Union Pacific, made a tour of the Colorado properties, for the purpose of considering the new work to be done this spring in building various short branches to develop coal and timber lands.

Winona, Marshalltown & Southern.—The organization of this company has been completed, and N. S. Ketchum, of Marshalltown, Ia., elected President. The company has been organized to build a line in the interest of the Winona & Southwestern from Osage, the present terminus of that road, in Mitchell County, south through Marshalltown, to the coal fields in Southern Iowa, through the counties of Mitchell, Floyd, Butler, Grundy, Marshall, Jasper, Marion and Lucas, running over nearly 100 miles of the coal fields of Iowa.

Yankton, Norfolk & Southwestern.—Notwithstanding the reports that this road has been in financial straits, the officers state that work has been progressing all winter. All the bridges along the line, except the one across the Missouri River, have been completed. Timber has been hauled to the Missouri, and contractors will immediately begin work on this structure. They are under bonds to have the bridge completed to the island, half way across the river, by July 1. Furthermore, the Great Northern has made a traffic arrangement and will operate the entire line from Sioux Falls through Yankton to Norfolk, Neb.

GENERAL RAILROAD NEWS.

Connecticut River.—The road was leased by the Boston & Maine on Feb. 6 for 99 years and the company has taken possession. The lease guarantees an annual rental equivalent to 10 per cent. on the capital stock, which is \$2,580,000, and four per cent. on \$1,300,000 scrip. Previous to signing the lease the Board of Directors of the Connecticut River road met, and in pursuance of the plan made a scrip distribution of 50 per cent. on the stock, being the \$1,300,000 on which the Boston & Maine guarantees four per cent. This scrip represents part of the money expended in recent years for improvements, extensions and equipment. It is redeemable in 10 years in cash or bonds, as the Boston & Maine may elect. The lease will be ratified by the stockholders on Feb. 17.

Duluth, Messabe & Northern.—There has been a bitter struggle between the different interests for the control of this property. Two suits have been brought in the United States Courts, each side seeking to prevent, by injunction, the movements of the other. The suits have been settled by the Merritt party purchasing the stock of K. D. Chase and Donald Grant. The Rockefeller, of New York, and the American Steel Barge Co., of West Superior, are interested with the Merritts in the purchase, and the new line from Oneota Point, near Duluth, to Stony Brook Junction, Minn., will now be built. Also the terminals at Oneota, the additional "whalebacks" for carrying the ore and the Eastern terminals on Lake Erie. It is probable that the Duluth & Winnipeg road will seek to enforce the ten-year contract for carrying ore, however, and additional trouble may come from this source.

Duluth & Winnipeg.—The Canadian Pacific is said to have secured control of this road, through the purchase of the stock of the North Star Construction Co., of Baltimore, which built the line. The purchase also includes the Superior Belt Line & Terminal, which built a belt line and docks at Superior, Wis., last year. The road is now operated for about 90 miles northwest of Duluth, and has been surveyed to a connection with the Canadian Pacific at Emerson, Minn., and it is probable that the line will now be extended to that point.

Findlay, Fort Wayne & Western.—The company is recording in Ohio a mortgage for \$1,600,000, given to the Washington Trust Company of New York, to secure an issue of new bonds for the proposed extension from Findlay, O., to New London, which was authorized at the recent stockholders' meeting. It is said that work will begin on this line this year.

Jacksonville, Tampa & Key West.—The argument in the receivership case, which was to have come up last week, has been postponed by an order from the United States Supreme Court staying all proceedings of the appellate court at New Orleans until March 6. The history of the case is briefly as follows: Early last July the American Construction Co. petitioned the District Court at Jacksonville that a Receiver be appointed. Before this court had acted in the matter a Pennsylvania company, whose interests are involved, asked for a Receiver of Judge Pardee, of New Orleans. Judge Pardee appointed R. B. Cable General Manager of the road, subject to the indorsement or approval of Judge Swayne, of Jacksonville. Judge Swayne, on the petition of the American Construction Co., named Mason Young, First Vice-President, as Receiver. There was an appeal from this appointment and the decision with it to the Court of Appeals, and the decision of Judge Swayne was declared vacated by that court in an order handed down in January.

Kansas City Bridge & Terminal Co.—The foreclosure sale of the "Winner properties," consisting of the partially finished bridge across the Missouri River, owned by this company and the Chicago, Kansas City & Texas Railroad, of which 22 miles is in operation to Smithville, Mo., were sold at Kansas City, Mo., Feb. 4, to Samuel Snow, of Cambridge, Mass., for \$200,000, representing the Union Security Co., of Boston, an organization formed by the bondholders of the two companies, of which Theodore C. Bates is President. The sale gives these stockholders now complete control of the property. The purchasers will organize a new company with a capital of \$4,000,000 to complete the enterprises. The old bondholders have agreed to accept second mortgage bonds of the new company for their holdings in the old companies. This amounts to \$1,400,000, the bonded indebtedness of the Kansas City Bridge & Terminal Railway amounting to \$975,000, and that of the railroad company to \$425,000. The \$2,500,000 of the first mortgage bonds will be sold, the proceeds to be used in completing the work of construction.

Louisville & Nashville.—The full returns for the first half of its fiscal year ending Dec. 31, 1892, are as follows:

	1892.	1891.	Inc. or dec.
Gross earnings.....	\$11,684,929	\$11,061,172	I. \$623,757
Operating expenses.....	7,173,607	7,048,797	I. 124,810
Net earnings.....	\$4,511,322	\$4,012,485	I. \$498,837
Total fixed charges.....	2,730,597	2,678,566	I. 52,031
Balance.....	\$1,790,725	\$1,332,899	I. \$457,826
Other income.....	203,117	248,785	D. 45,668
Balance.....	2,008,145	1,582,684	I. 425,461
Loss on leases.....	48,301	78,357	I. 30,056
Surplus.....	\$1,945,541	\$1,504,307	I. \$441,234
Dividends (2 p. c.).....	1,056,000	(2½ p. c.) 1,320,000	D. 264,000
Surplus.....	\$889,541	\$184,307	I. \$705,234

Middle Tennessee & Alabama.—The Decatur, Chesapeake & New Orleans road has been reorganized under the above name. The Reorganization Committee completed the arrangements for the transfer at a recent meeting in Nashville, Tenn., and new directors were elected, as noted in another column. About 35 miles of the road is now completed, through Lincoln County, Tenn., from Booneville, south of Shelbyville, to the Alabama State line. It is reported that contracts will be soon awarded for completing the entire 75 miles between Shelbyville and Decatur, Ala.

Morristown & Cumberland Gap.—By petition of a majority of the stockholders, Jackson Smith, of Knoxville, has been appointed Receiver of this road which is in operation between Morristown and Coryton, Tenn., 40 miles. W. S. Whitney was the former Receiver.

New York, New Haven & Hartford.—The chief owners of this road have made an agreement with the directors of the Old Colony for the control of the latter by the former. Some of the details of the transaction are given in the editorial column. The approximate cost of the acquisition is shown by the following statement given out at Boston: Old Colony stock opened on Wednesday 1½ lower than yesterday, at 201, rose to 213 and settled back to 210 again. The cost to the New Haven of the control of the Old Colony is figured in this way: At 250, less rights, New Haven stock figures at 232. Nine shares amount to \$2,088, and as 10 shares of Old Colony get nine shares of New Haven, this makes Old Colony 200. There are 135,675 shares of Old Colony stock, calling for the issue of 122,107½ shares of New York, New Haven & Hartford. Ten per cent. on this is \$1,221,075. The seven per cent. paid by the Old Colony is \$849,525, making the difference \$271,550, which appears to be the increased annual dividend charge to the New Haven, and may be put down as the cost to it of securing the Old Colony. The New Haven officers have issued the following statement: The New Haven company possesses the only feasible rail entrance from New England into the city of New York, but at its three eastern terminal it supplies facilities for separate competing Boston lines, so that there are practically three independent routes over its

rails to Boston, each demanding the best facilities and each insisting that its rivals shall receive no benefits in which it does not participate. The rail travel between Boston and New York alone is not of sufficient volume to warrant the present express train service (14 trains each way daily). The two recently added limited trains, which carry few others than through passengers, return revenue barely sufficient to meet the expense of their operation. To go on, therefore, providing two or three additional trains over the different routes whenever there is reason for the addition of one has become too great a burden upon all the lines. The constantly increasing public demand for better and faster service between Boston and New York can be successfully met only by such consolidation of interests as will result in an increase of the combined revenue.

The New England road was found to be wholly ineligible; the New Haven already possesses the most direct route to New York from the thirteen most important places upon the New England line. The excellently managed and equipped Boston & Albany road forms an exceptionally favorable Boston and New York line, but has more important traffic relations at Albany, in which the New Haven has no interest. The New Haven management therefore turned its attention to the Old Colony, with which it connects at Providence (only forty-four miles from Boston), and with which it already interchanges the larger portion of its Boston freight and passenger traffic. The Old Colony has about 600 miles of railroad, and operates a large fleet of passenger and freight steamers between Fall River, Newport and New Bedford and New York, carrying a very large proportion of the through traffic between New York and Boston and points in Eastern New England. The present interchange of traffic, which is very large and valuable, can by joint management be greatly increased. The New Haven's interest in the Providence and Stonington Steamship Co. can be united with like interest of the Old Colony in the Fall River line with beneficial results. One of the first public benefits likely to result will be the shortening of time of one or more of the Shore Line express trains, and the whole Shore Line service will be materially improved.

Peoria, Decatur & Evansville.—The stockholders of the road will meet March 14 at Peoria, Ill., to vote on consolidation with the Chicago & Ohio River road, and to authorize a consolidated mortgage.

Richmond & West Point Terminal.—Correspondence was published this week between the Reorganization Committee and Drexel, Morgan & Co. looking to the reorganization of the road by that firm on the conditions expressed in the letter of June 28 to the Reorganization Committee, which ended similar negotiations proposed early in the summer. Drexel, Morgan & Co.'s letter to the committee is as follows: "We have received your favor of this date inviting us to take up the reorganization of the Richmond Terminal and its allied properties. Since our correspondence of last summer we have not kept ourselves advised as to the Richmond Terminal situation, nor are we conversant with the legal or other changes which may have occurred. Relying upon the support and aid of which you assure us in case we take up the reorganization we are willing to make such further examination as may be necessary to acquaint ourselves with present conditions, and, if after such examination, we find no reason to change our views then expressed as to the possibility of a successful reorganization of the properties, we will take up the business on the basis set forth in our letter of June 28, 1892."

Southern Pacific.—Judge Hebbard at San Francisco has handed down a decision in the suits against the Central and Southern Pacific roads for the recovery of taxes. The decision is against the railroads. The action was brought to recover both state and county taxes for the year 1887, amounting to \$650,000, with five per cent. penalty for delinquency, and interest. The court allows the attorneys for the people a contingent fee of 10 per cent. The railroad companies held that the assessment for taxes was illegal, because the Federal franchise was included in the assessment. The court finds that the Federal franchise was not included in the assessment, and finds against the defendants on other points.

TRAFFIC.

Traffic Notes.

The Philadelphia & Reading and the Baltimore & Ohio have made an agreement to send all coal from the lines of the latter, destined for Washington, via Hagerstown. Certain coal miners of Rock Springs, Wyo., complain that the Union Pacific has increased the freight rate on coal to the Missouri River, at the same time reducing the price of coal at the mines owned by the company.

The Atchison, Topeka & Santa Fe is taking considerable quantities of grain from Kansas to Galveston for export. It was stated last week that the average receipts were 75 cars a day. The two elevators at Galveston have a capacity of 1,400,000 bushels.

The roads of the Southern Railway & Steamship Association lately agreed to discontinue granting annual passes to the Western meat shippers, and the announcement created considerable stir, but it appears that the Mobile & Ohio continues the passes, so that the agreement is not likely to be long lived.

The Pacific Mail Steamship Company has been declining to receive freight at San Francisco for New York and also for European ports on account of the expiration of the contract with the Panama Railroad. It appears that in the absence of a through billing arrangement the rates on the railroad may prove to be prohibitive.

Compartment sleeping cars seem to be growing in popularity in the Northwest. Mann boudoir cars have been running between Chicago and St. Paul on the Chicago Great Western for several years. For some time back the Chicago & Northwestern has run Wagner compartment sleeping cars between these cities, and now the Chicago, Burlington & Northern announces that a compartment sleeper will be run on each night train.

The Transcontinental roads, after a protracted conference at St. Paul, have agreed upon a reduction in rates to Spokane, the reduction being occasioned by the completion of the Great Northern. The people of Spokane have been loudly complaining for some time, and secured an opinion on the subject from the Interstate Commerce Commission. It is said that the reductions will vary from 7 to 10 per cent. It appears that these rates only partially comply with the orders of the Interstate Commerce Commission.

The Pennsylvania and the Central of New Jersey have made a traffic agreement whereby the latter will receive a large amount of anthracite coal from the former. The shipments will be made principally from the Nanticoke

region, and a connecting track is now being constructed which will join the two roads at Nanticoke. From there the haul will be to Ashley Plains, to Phillipsburg, thence over the Belvidere Division to Trenton and on to tidewater. The present route is by way of Sunbury, Harrisburg and Philadelphia. The new route is much shorter and quicker than the old.

The Philadelphia papers publish figures showing that the number of passengers using the Broad street station of the Pennsylvania during 1892 was about 20 millions, an increase of about four millions over 1891. It appears that the heaviest month in 1892, September, was about 22 per cent. heavier than the lightest one, January. The number in and out in January was 1,425,000 and in September 1,740,000. These figures include, we suppose, the through trains from Pittsburgh and Baltimore to New York, and vice versa, which run in to this station and out again. This station was opened on Dec. 6, 1881. The number of trains using it then was about 100 a day; now it is 530 a day.

It is announced from Cleveland that the railroads in the Ohio Coal Traffic Association have reached an agreement for next season. The Columbus, Hocking Valley & Toledo and Columbus, Shawnee & Hocking were induced to revoke the notices of withdrawal which they had served upon the Association. The Ohio Coal Traffic Association consists of six roads—the Columbus, Hocking Valley & Toledo, the Toledo & Ohio Central, the Baltimore & Ohio, the Wheeling & Lake Erie, the Cleveland, Lorain & Wheeling and the Columbus, Shawnee & Hocking. The latter now has its own outlet to the lakes, the Sandusky & Columbus Short Line. An executive committee has been formed by the selection of a representative of each road. This committee is to meet once a month. Percentages were agreed upon as follows: Hocking Valley, 36.70 per cent.; Wheeling & Lake Erie, 18.50 per cent.; Cleveland, Lorain & Wheeling, 18.40; Toledo & Ohio Central, 15.40; Columbus, Shawnee & Hocking, 7.60, and the Baltimore & Ohio, 3.40. The last two named are the most extensive shippers from Sandusky. A. D. Smith, of Columbus, is the Secretary of the Association.

Chicago Traffic Matters.

CHICAGO, Feb. 8, 1893.

Passenger rates in the territory of the Chicago & Ohio River Traffic Association were advanced to-day to the basis of \$7 between Chicago and Louisville and between Chicago and Cincinnati. This is the compromise basis agreed upon by the roads to remain in effect until such time as permanent rates are named by the arbitrators.

Eastbound shipments last week amounted to 78,615 tons, against 80,042 for the preceding week, a decrease of 1,427 tons, and against 105,259 for the corresponding period last year. The shipments included: Flour, 9,014 tons; grain and millstuffs, 38,624 tons; provisions, lard, etc., 8,606 tons; dressed beef, 10,811 tons; flaxseed, 3,147 tons; hides, 2,300 tons; lumber, 3,901 tons; miscellaneous, 2,322 tons. The Lake Shore took 16,533 tons, and the Fort Wayne 9,616 tons.

Passenger Rates to the World's Fair.

The Trunk Line Executive Committee has agreed to the issue of both one-way and round-trip tickets at reduced fares during the Exposition. On all trains in trunk line territory which occupy more than 35 hours on the trip from New York to Chicago the rates, as heretofore announced, will be 20 per cent. under present rates, with a stop-over privilege at one point in each direction. The basis (New York to Chicago) for excursion rates will be as follows:

	One way.	Round trip.
N. Y. C. and Penn.....	\$16.10	\$32.00
Erie and West Shore.....	11.40	28.80
D. L. & W., L. V., B. & O. and N. Y., Ont. & W.....	13.60	27.20

It was also decided that unlimited tickets may be sold one way and for round trips, with stop-over privileges as desired, at the present limited rates, as follows:

	One way.	Round trip.
N. Y. C. and Penn.....	\$20	\$40
Erie and West Shore.....	18	36
D. L. & W., L. V., B. & O. and N. Y., Ont. & W.....	17	34

Tickets may be sold good on one line in one direction and on another line in the opposite direction.

A Soliciting Freight Agents' Association.

The Association of Freight Agents of the Middle States is the name of an organization recently completed, and of which the Pittsburgh agent of every Western line represented here is a member. The organization, which is for the purpose of maintaining rates on a tariff basis, was completed at Cleveland, with Jas. D. Welch, Agent of the Union Pacific at Cincinnati, as Chairman; W. H. Connor, of the Southern Pacific at the same place, Vice-Chairman; D. H. Maloney, Freight Agent of the Rock Island at Cleveland, Treasurer; and C. C. McCarthy, Contracting Agent of the Missouri Pacific at Pittsburgh, Secretary. The organization is now on a permanent basis. One of the features of this organization will be district committees which are being formed in each principal city within the limits of the Association. One has just been organized in Pittsburgh, with Commercial Agent Thompson of the Vandalia as Chairman, and Contracting Agent Bihler of the Cotton Belt as Secretary. This District Committee will meet probably semi-monthly, while the meetings of the general organization will be bimonthly. All the Western lines represented here are members of this District Committee, and an effort will be made to have the initial lines enter into the Association.—Pittsburgh Post.

Colorado Coal Traffic.

The coal trade of Southern Colorado has not been up to the maximum this season, the falling off being due to mild weather in the West and to a difficulty in getting miners. The average daily shipments in carloads of 10 tons have been as follows: Sopris, 69 cars and 17 of coke; Engleville, 35 and 20 of coke; Forbes, 30; Berwind, 40; Hastings, 50 and 10 of coke; Aguilas, 25; Rouse, 50; Walsens, 50; Pictou, 20; total, 240 carloads of coal and 47 of coke. In the Cañon district the shipments have been: Coal Creek, 40; Oak Creek, 13; Chandler, 8. The Atchison, Topeka & Santa Fe coal properties at Trinidad and Cañon have kept up to the usual average, but the figures are not available. Probably the output of Atchison miners at Trinidad is 75 cars and at Cañon 35 cars a day.

The mines in Western Colorado are working to their full capacity. This year will see great developments in coal lands in the Western portion of the state. The Rio Grande and the Union Pacific are building several coal branches to open up new fields, while the mines reached by the Colorado Midland are all doing considerable development work.